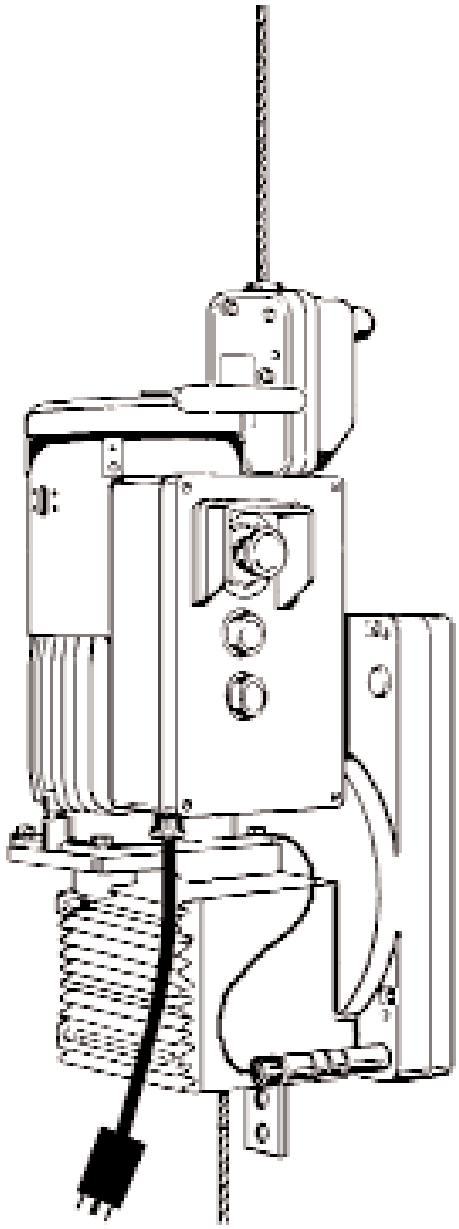
tirak®

XE501PA1



Date: 10/06/03
Version: 2
Draft: 5

Service & Maintenance Manual for Electric Powered Hoists

Tractel Group
Griphoist Division

BASIC TROUBLESHOOTING

WARNING

This sheet is to be used by certified Tirak technicians only!

Repair and maintenance of the Tirak hoist should always be accomplished in a safe environment!

The purpose of this sheet is for quick reference only. Most troubleshooting solutions can be found on pgs. 17 & 18 of the Tirak Instruction Manual included with each hoist.

PROBLEM	POSSIBLE CAUSE
High amps and/or heat	Low power
	Centrifugal switch (stuck closed)
	Start capacitor defective
	Stator burned
	Brake dragging
	Water damage
	Hoist overloaded
Hoist frozen electrically (ie. Won't run in either direction)	Brake rectifier defective
	Run capacitor defective
	Brake coil defective
	Fuse defective
Hoist goes up but not down	Blocstop has been activated
Up and/or Down button does nothing	E-stop button has been activated
	Fuse defective
Hoist goes down when up button is pressed	Centrifugal switch (stuck open) defective
	Capacitor (start and/or run)
Hoist will not lift a suspended load	Start capacitor defective
	Low power
Slightly higher amps than normal	Run capacitor defective
Fuse in control circuit blows immediately	Main relay coil short circuit
	Fuse defective
	Thermal protector is shorted

Table 001

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NOTE:
Throughout the text, parts will be referred to as codes and positions (e.g stirrup bar, Code #47867, Pos. 84). These codes and positions can be found at the end of each chapter in the “Parts Lists” and “Exploded Views”.

1) GENERAL INFORMATION

1-1 UL Listing Card

Northbrook, Ilinois (847) 272- 8800
Melville, New York (631) 271-6200
Santa Clara, California (408) 985-2400
Research Triangle Park,
North Carolina (919) 549-1400
Camas, Washington (360) 817-5500

Underwriters Laboratories Inc.®

TRACTEL INC
GRIPHOIST DIV
110 SHAWMUT RD
PO BOX 188
CANTON, MA 02021

TUFV April 18, 2002
Equiptment, Scaffolding

TRACTEL INC GRIPHOIST DIV **SA4785**
110 SHAWMUT RD PO BOX 188, CANTON MA 02021

Electric scaffold hoists, Models ETH-32L, XE301P, maximum load 700 lbs: Models ETH35C, ETH35C3, ETH35X, LE500P, LE501P, TE401P, -401PA, **XE**500P, **-**501P, -**501PA**, **maximum load 1000lbs**; Models TE1000P, -1001P, -1001PA, XE501PO, XE700P, -701P, XE720P, XE721P, maximum load 1500lbs; Models TE1020P, -1021P, -1021PA, maximum load 2000 lbs; Model XE1020P, maximum load 2400 lbs; Model XE2050P, maximum load 4400 lbs.

Manually operated scaffold hoists, Model TMS-600, maximum load 1320 lbs; Model TU-17, maximum load 1500 lbs; Model TU-28, maximum load 3000 lbs; Model TU-32, maximum load 6000 lbs; Model 408, maximum load 880 lbs.

Pneumatic scaffold hoists, Models ATH32L, -32LB, XA300P, -300PB, maximum load 700 lbs; Models ATH35C ATH35X, -35XB, LA500P, XA500P, -500PB, maximum load 1000 lbs; Models XA700P, -700PB, XA720PB, maximum load 1500 lbs; Model XA1030PO, maximum load 1850 lbs; Model TA1020P, maximum load 2000 lbs; Model XA1020P, maximum load 2400 lbs; Model XA2050P, maximum load 4400 lbs; Model XA2650P, maximum load 5300 lbs.

Independent secondary brakes, Model BS15.301, maximum load 1500 lbs; Model BS20.301, maximum load 3000 lbs; Model BS35.30, maximum load 6000 lbs.

Modular work platform, “Modular Staging”, 2 to 12 m, rated 750 lbs; Models KD01, MP03, 2 to 18m, rated 750 to 1500 lbs; “PFD”, 2 to 15m, load 6000 lbs.

Work Cages, Model PMR0700D, PMR0701D, VSMV-PMR0710D, rated 1000 lbs; Model WC01, rated 400 lbs.

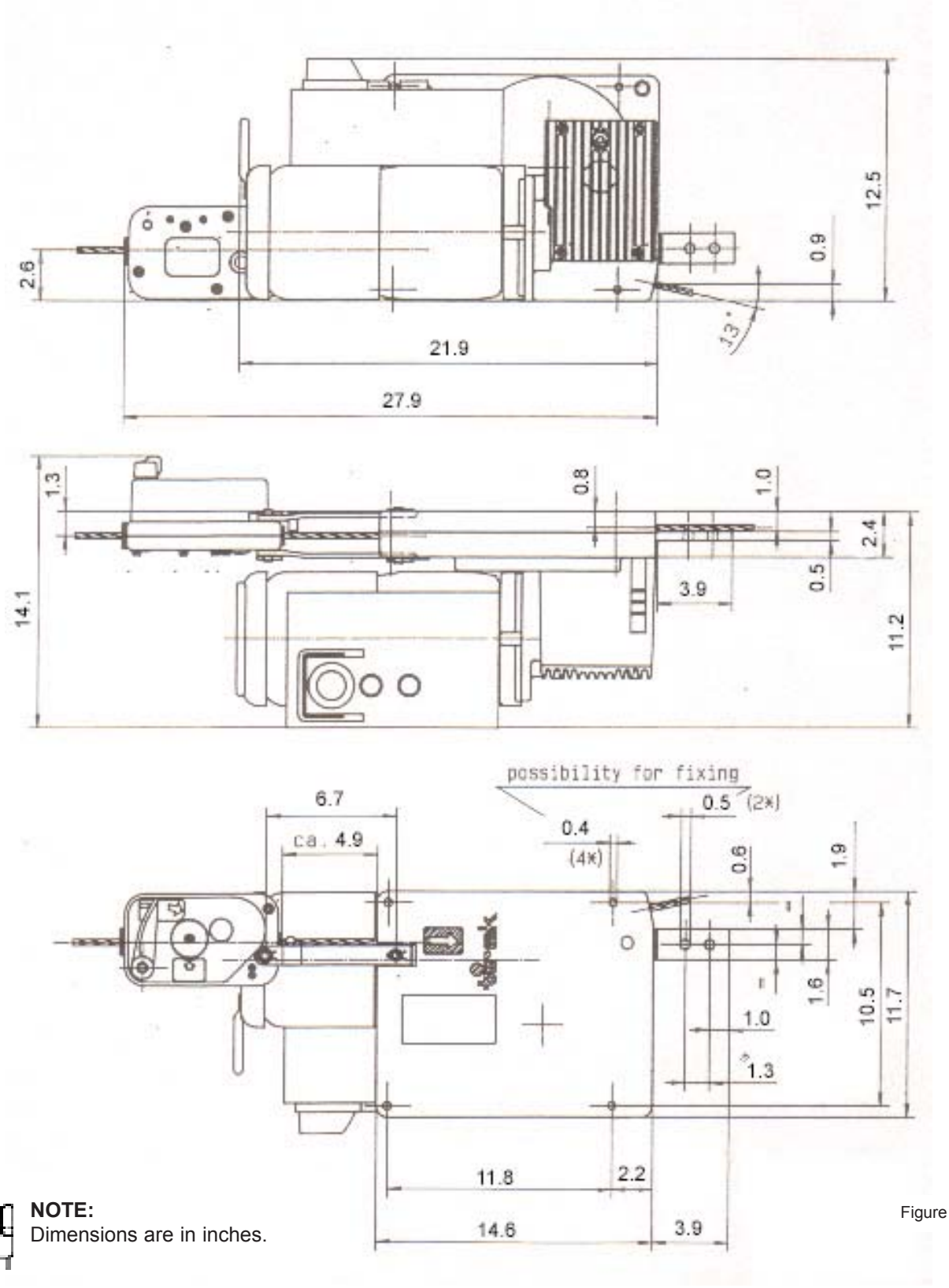
This equipment consists of separate parts inspected at the factory by Underwriters Laboratories Inc. and is intended for use in complete complete installations. Installations are not inspected by Underwriters Laboratories Inc. but should be made in accordance with requirements of authorities having jurisdiction.

LOOK FOR CLASSIFICATION MARK ON PRODUCT

Figure 101

1-2 Dimensional Information

TRACTEL Inc.	Tirak XE501PA1 with BSO 500 and stirrup adapter	287237M	
Motor: UCE 90L/10-F		Date:	10/6/03



NOTE:
Dimensions are in inches.

Figure 102

1-3 Model Identification Table

Type Designation of TIRAK Scaffolding Hoist

X SD 5 0 2 P
X E 5 0 1 PA 1

Tirak-type

X = 1 driver disc
T = 2 driver discs
G = Gripwinch (for material handling only, US-version)

Capacity
lbs. [kg]

3 = 700 [300]
5 = 1000 [500]
7 = 1500 [700]
8 = 1600 [800]
10 = 2200 [1000]
16 = 3500 [1600]
20 = 4400 [2000]
30 = 6600 [3000]

Wire Rope
in. [mm]

0 = 5/16 [8]
1 = 1/4 [6]
2 = 3/8 [9]
3 = [10]
4 = [11]
5 = 9/16 [14]
6 = 5/8 [16]

Secondary Brake

1 = BSO500
2 = BS/BSO500

Execution

P = Man riding
PA = 220 V, 1 Ph, 60 Hz, 500 kg for USA/CAN only
PO = with overload
No declaration = material handling

Operation

A = Air operated
D = Dual wire rope Tirak
E = Electric operated Tirak USA/Canada
H = Hydraulic operated
HB = Hydraulic operated with brake
N = Hand crank on motorshift
S = Silo hand crank on gear box

Working Speed f/m [m/min]

	Kind of Motor	50Hz		**60Hz**		for X2000/3000			
						50Hz		60Hz	
0 =	3 Ph	30	[9]	35	[11]	20	[6]	23	[7]
or Air motor or Hydraulic motor									
2 =	3 Ph	60	[18]	70	[22]	50	[12]	45	[14]
3 =	3 Ph	30/60	[9/18]	35/70	[11/22]	20/40	[6/12]	23/45	[7/14]
4 =	3 Ph	15	[4, 5]	17	[5, 5]	10	[3]	12	[3, 5]
5 =	3 Ph	15/30	[4, 5/9]	17/35	[5, 5/11]	10/20	[3/6]	12/23	[3, 5/7]
6 =	3 Ph	15/60	[4, 5/18]	17/70	[5. 5/22]	10/40	[3/12]	12/45	[3, 5/14]
7 =	3 Ph	variable speed, 0 to 35/70/100 [0 to 9/18/30]							
1 =	**1 Ph**	15	[9]	**35**	**[11]**	-	-	-	-
9 =	G	39	[12]	39	[12]	-	-	-	-

Kind of motor

3 Ph = 3 phase motor
1 Ph = single phase motor
G = DC motor

1-4 Test Certificate XE501PA1

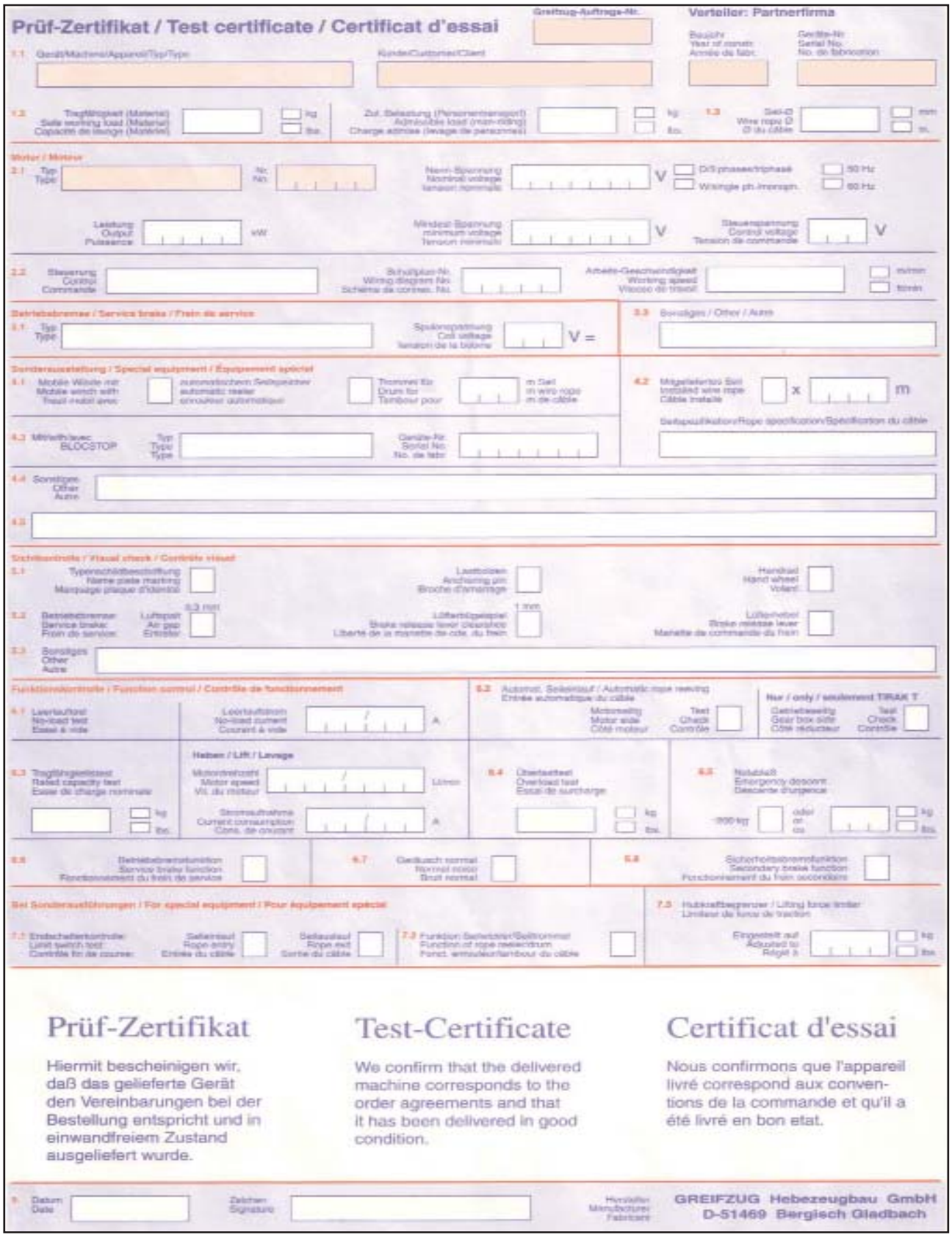

Prüf-Zertifikat / Test certificate / Certificat d'essai
Verteiler: Partnerfirma
Prüf-Zertifikat
Hiermit bescheinigen wir, daß das gelieferte Gerät den Vereinbarungen bei der Bestellung entspricht und in einwandfreiem Zustand ausgeliefert wurde.
Test-Certificate
We confirm that the delivered machine corresponds to the order agreements and that it has been delivered in good condition.
Certificat d'essai
Nous confirmons que l'appareil livré correspond aux conventions de la commande et qu'il a été livré en bon etat.
GREIFZUG Hebezeugbau GmbH
D-51469 Bergisch Gladbach

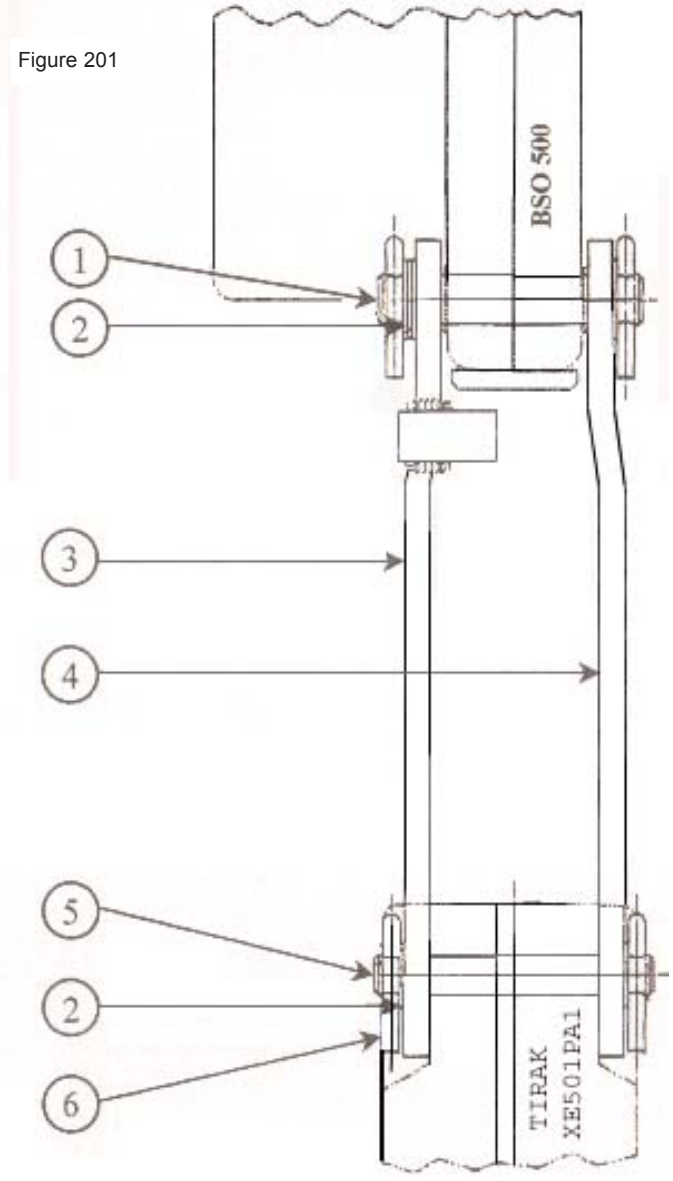
Figure 103

2) SECONDARY BRAKE ATTACHMENT XE501PA1

2-1 BSO500 Secondary Brake Mounting Parts List

Spare Parts	Drawing	13479	BLOCSTOP BSO 500		N°	E-3054
	List	-			Edition	1
	State	05.04.95	200V / 60 Hz Single Phase	for XE501PA1	Date	4/1803

Figure 201



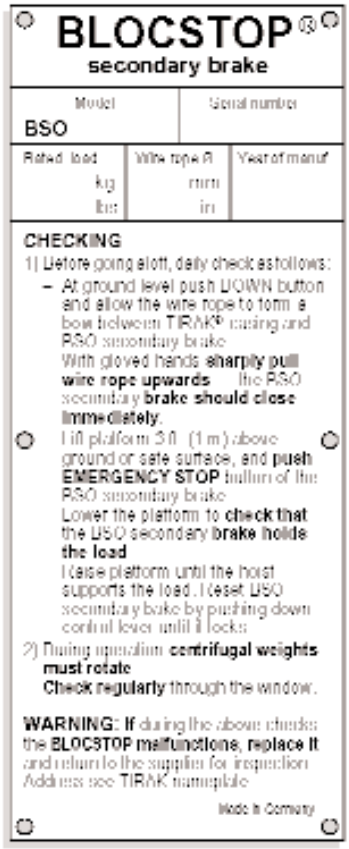

BLOCSTOP®
secondary brake
Model
BSO
Serial number
Rated load
kg
lbs
Wire rope Ø
mm
in
Year of manuf
CHECKING
1) Before going aloft, daily check as follows:
– At ground level push DOWN button and allow the wire rope to form a bow between TIRAK® casing and BSO secondary brake
With gloved hands sharply pull wire rope upwards the BSO secondary brake should close immediately.
Lift platform 3 ft (1 m) above ground or safe surface, and push EMERGENCY STOP button of the BSO secondary brake
Lower the platform to check that the BSO secondary brake holds the load
Raise platform until the hoist supports the load. Reset BSO secondary brake by pushing down control lever until it locks
2) During operation centrifugal weights must rotate
Check regularly through the window.
WARNING: If during the above checks the BLOCSTOP malfunctions, replace it and return to the supplier for inspection
Address see TIRAK nameplate
Made in Germany

Figure 202

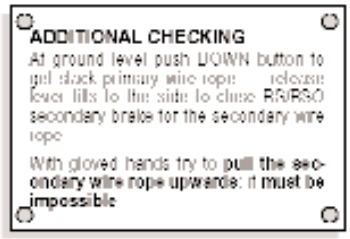

ADDITIONAL CHECKING
At ground level push DOWN button to get slack primary wire rope release lever tilts to the side to close BSO secondary brake for the secondary wire rope
With gloved hands try to pull the secondary wire rope upwards: it must be impossible

Figure 203

Pos.	Code #	Qty	Description	Dimensions / Comments
1	45735	1	Blocstop Pin	0.472 x 2.677 in. [12 x 68 mm]
2	9816	4	Blocstop Washer	Ø 0.472 / Ø 0.748 x 0.039 in. [Ø 12 / Ø 19 x 1 mm]
3	46637	1	Mounting Strap A	6.71 in. [170.5 mm] w/lug (slight bend)
4	66785	1	Mounting Strap B	6.71 in. [170.5 mm]
5	58035	1	Casing Pin	0.472 x 2.87 in. [12 x 73 mm]
6	46496	4	Cotter Pin	0.157 x 0.984 [4 x 25 mm]

Table 201

3) WIRE ROPE DRIVING SYSTEM

3-1 Introduction

Although the drive system of the Tirak hoist is one of the most simplest and reliable system in the market, it still requires service from an authorized repair station for safe and efficient operation. It is recommended the following service procedures are performed every six (6) months but they may need to be repeated more often depending on the work environment the hoist is subjected to.

NOTE
Regular Inspection services will decrease downtime.

3-2 Tools Required (Figure 301)

- Rubber mallet
- Pry bars (2)
- Straight-edge ruler 12" min.
- 10mm Box wrench
- Screwdriver (flat)
- 5 mm Allen key
- 8 mm Allen key
- Diagonal cutting pliers

Figure 301

3-3 Blocstop Removal

Using diagonal cutting pliers, detach the Blocstop BSO500 strap from the hoist by removing the top cotter pin shown in Figure 302.

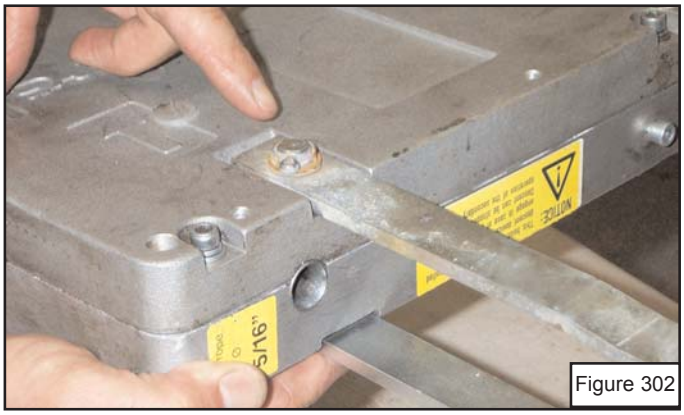


Figure 302

3-4 External Inspection

1) Inspect outer casing for damage. Pay extra attention to the area indicated shown in Figure 303. Look for imprints that may indicate further damage inside.

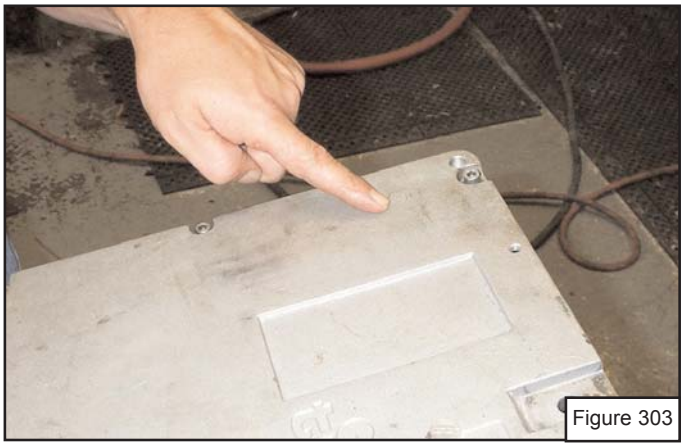


Figure 303

2) Inspect the stirrup adapter shown in Figure 304 (TIRAK ONLY) for wear or damage. If the stirrup bar {#47867, Pos. 84} is bent, it indicates improper rigging. Replace if necessary.

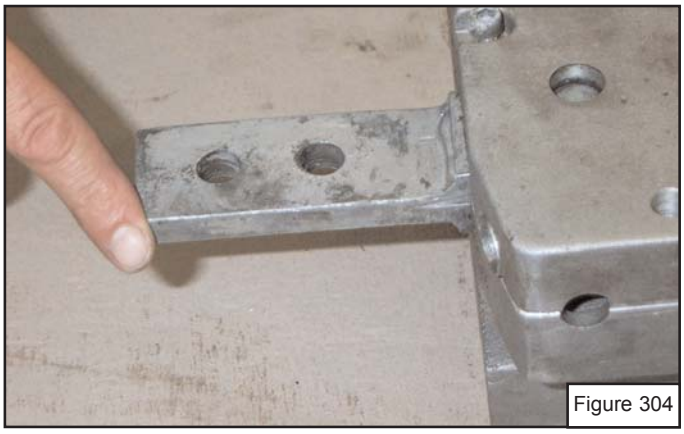


Figure 304

3-5 Casing Cover Removal

1) Remove the four (4) cap screw assemblies in the corners (Figure 305) consisting of the following:

   a. M6x50 socket head cap screws {Code #12016, Pos. 69}
   b. Lock-washers {Code #16616, Pos. 73}
   c. Flat washers {Code #36306}
   d. Square nuts {Code #39356, Pos. 74}

Figure 305

2) Remove the other three (3) cap screw assemblies in the cover (Figure 306) consisting of the following:

   a) M6x30 socket head cap screws {Code #5336, Pos. 70}
   b) Lock-washers {Code #16616, Pos. 73}
   c) Flat washers {Code #36306}

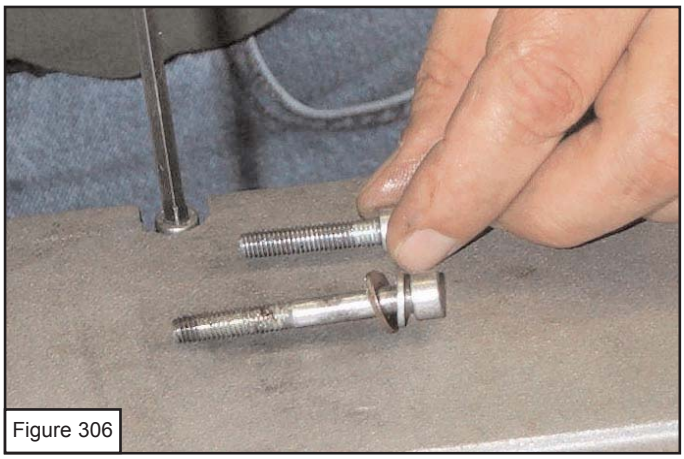


Figure 306

3) Insert a screwdriver in the casing above the stirrup adapter as shown in Figure 307. Carefully pry the casing open.

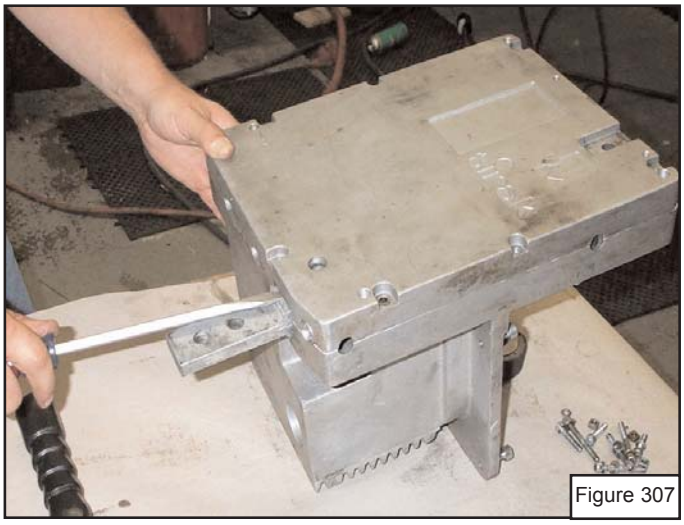


Figure 307

4) When the cover opens enough, insert a second screwdriver. Begin to lift evenly at the corners of the cover as shown in Figure 308.

Figure 308

5) Inspect inside of cover {Code #43775, Pos. 2} for damage or evidence of wire rope jams and cracking near the stirrup bar pocket. Inspect pin hole for damage (Figure 309).

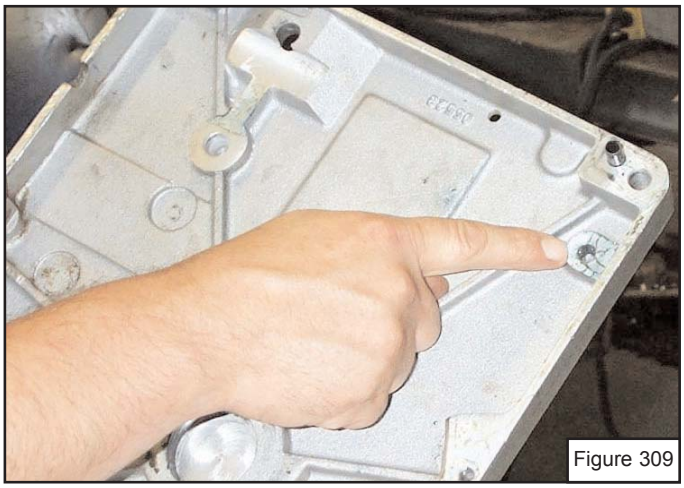


Figure 309

5b) Pay special attention to the areas indicated in Figure 310 and Figure 311. All surfaces should be smooth to prevent cutting or snagging of the wire rope. Replace or repair as needed.

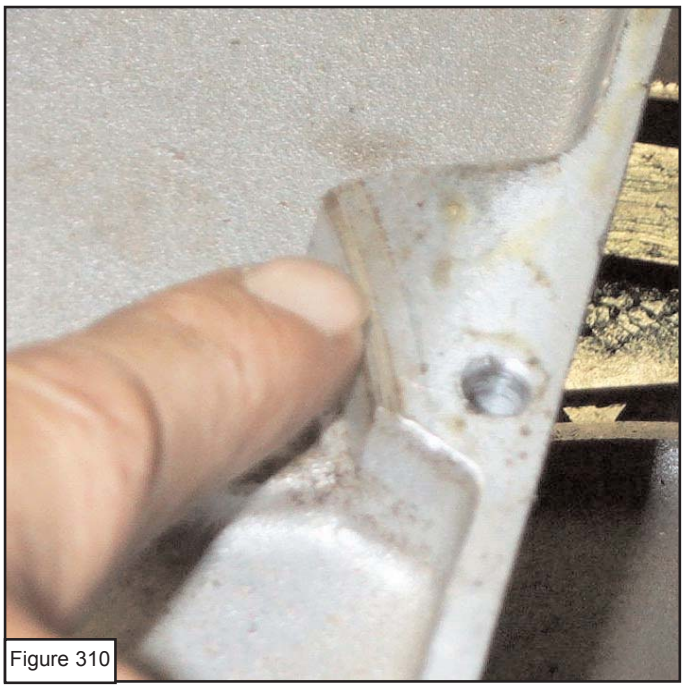


Figure 310

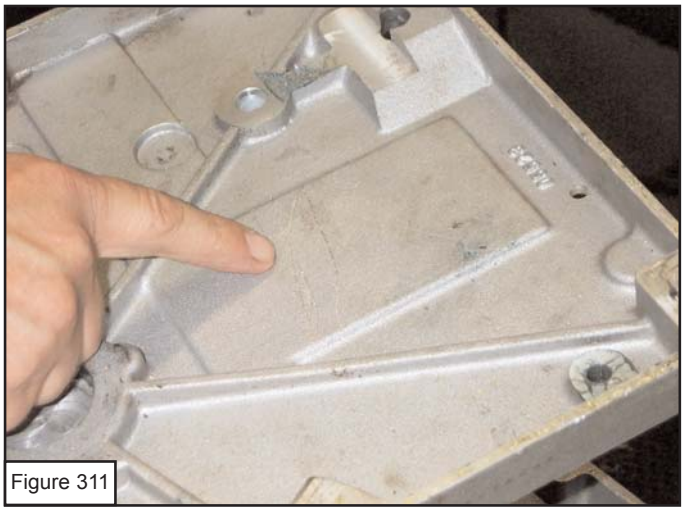


Figure 311

3-6 Internal Inspection

1) Remove and inspect the stirrup adapter {Code #47867, Pos. 84} in Figure 312. Ensure it is straight and the anchor pin is secure.

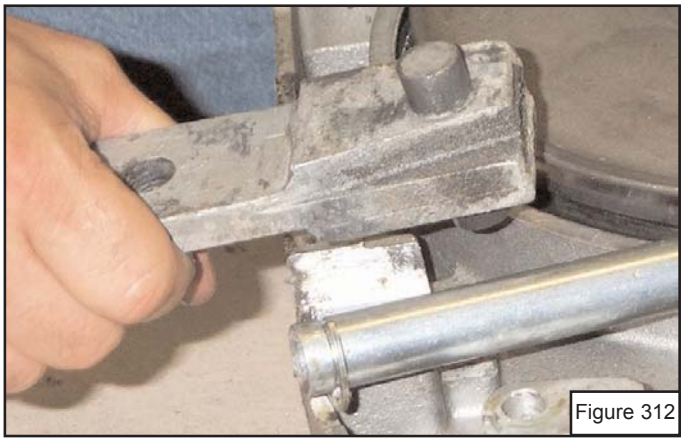


Figure 312

2) Remove and inspect the exit tube {Code #43825, Pos. 11} shown in Figure 313. Ensure it's free of debris inside. Inspect the snap ring {Code #6846, Pos. 57} and exit tube for damage. Clean or replace as needed.

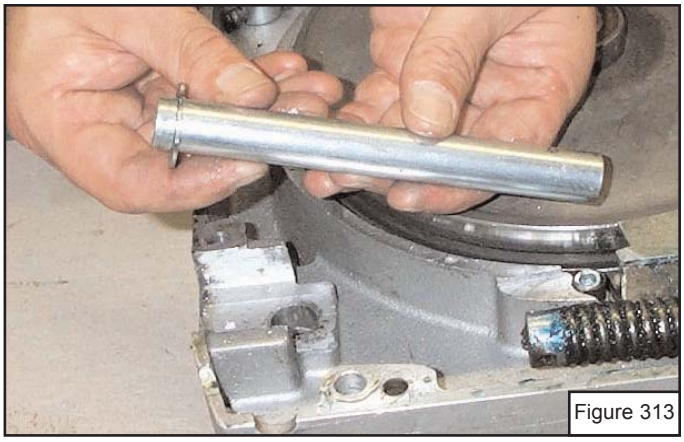


Figure 313

3) Remove the two M6x50 socket head cap screws {Code #12016, Pos.69} and spring washers {Code #16616, Pos. 73} in Figure 314.

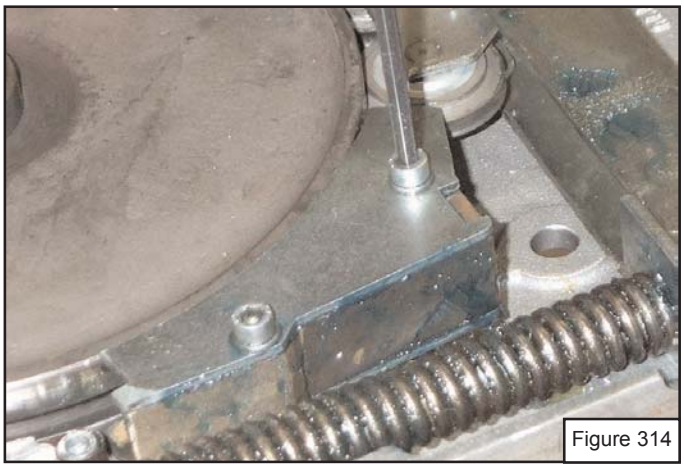


Figure 314

4) Inspect the upper wire rope guiding plate {Code #43855, Pos. 14} and compare it to Figures 315 and 316.

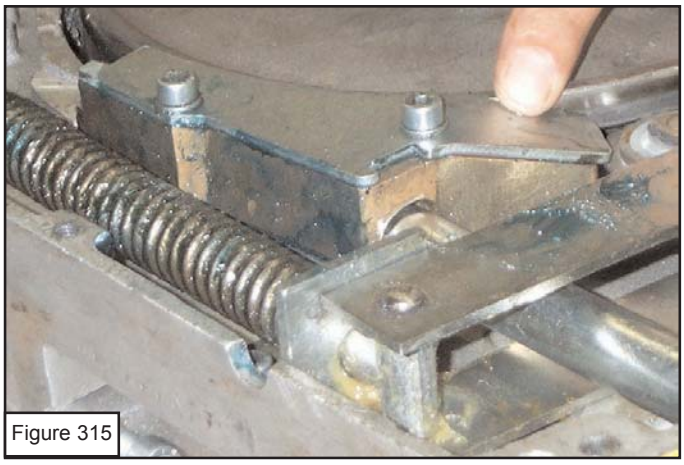


Figure 315

4b) Figure 315 shows how the guiding plate should look like. Figure 316 shows a bent or damaged wire rope guiding plate.

Figure 316

NOTE
IF the plate shows damage, this indicates a wire rope jam has occurred and the pressure system must be carefully inspected.

5) Inspect the pressure system {Code #42227 Pos.31B} shown in Figure 317. This inspection must be carried out every time the casing cover is removed. Place a straight-edge across the top of the pressure system. Ensure the system is perfectly straight. If any damage has occurred to the system the entire assembly must be replaced (see Sec. 1-1.9).

Figure 317

6) Remove the entrance tube {Code #43835, Pos. 12} and snap ring {Code #6846, Pos.57} as shown in Figure 318. Inspect the entrance tube and clip for damage. Ensure the entrance tube is free of debris. Clean, repair or replace as necessary.

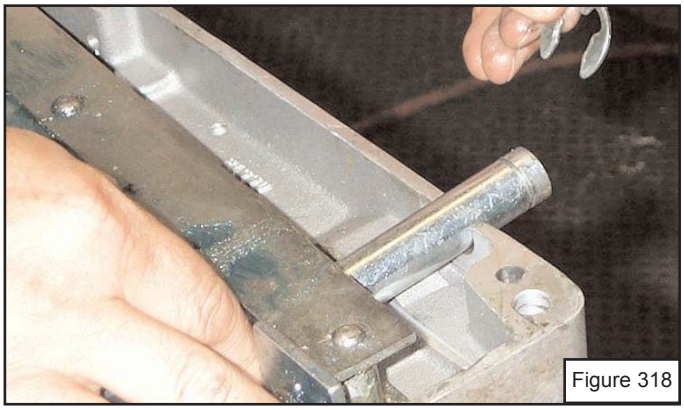


Figure 318

7) Inspect the wire rope guiding device {Code #43865, Pos.13} in Figure 319. Repair or replace as necessary.

Figure 319

NOTE
Earlier hoists had brass guiding devices. The inspection is the same for either type (Figure 320).

Figure 320

8) Inspect the lower wire rope guiding plate {#43845, Pos. 15, Figure 321} for wear or damage. Repair or replace as necessary.

Figure 321

9) Inspect the wire rope guiding band {#27217, Pos.30, Figure 322} for wear or damage. Repair or replace as necessary.

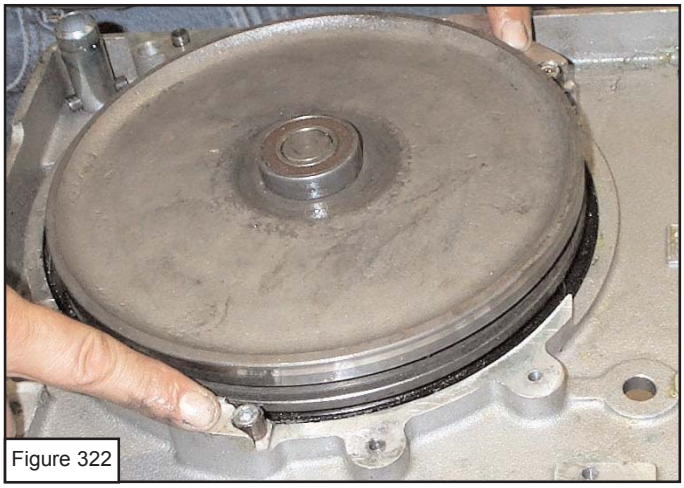


Figure 322

NOTE
The regular service inspection is now complete. Clean all components with mineral spirits and dry thoroughly.

3-7 Reassembly

1) Re-grease the pressure system {#42227, Pos. 31B} with wheel bearing or white lithium grease.

WARNING

Never use grease containing molybdenum disulphide (moly-b) or graphite in the Tirak.

2) Reinstall the lower guide plate {#43845, Pos. 15}, wire rope guiding device {#43865, Pos. 13} and upper guide plate {#43855, Pos. 14, Figure 23}.

3) Reinstall the wire rope entrance tube {#43835, Pos. 12} and snap ring {#6846, Pos. 57}. Place the snap ring onto the entrance tube and rotate it so the tabs are up. This extra bit of clearance eases installation of the casing cover.

4) Reinstall the exit tube {#43825, Pos. 11} with snap ring {#6846, Pos. 57} (tabs up). See Figure 18.

5) Reinstall the stirrup anchor bar {#47867, Pos. 84}. See Figure 17.

3-8 Casing Cover Installation

Figure 323

1) Using a hammer and dowel punch, gently tap the alignment dowels flush in the casing cover (Figure 323).

2) Carefully place the casing cover over the pressure system dowel pin. **Ensure it sits directly over the pin!!!** (Figure 324).

Figure 324

3) Place one hand on the casing cover as shown in Figure 325. Using a dead blow RUBBER mallet, tap the cover onto the base.

NOTE
Keep pressure on the cover to prevent damage to the cover.

Figure 325

4) Using a hammer and dowel pin, realign the dowels flush with the base.

5) Reinstall the four sets of M6 casing cover screws, washers and square nuts (See Figure 10).

6) Reinstall the three sets of M6 casing cover screws and washers (See Figure 11).

CAUTION

Ensure that the cotter pins are bent completely over to prevent any sharp edges.

7) Reinstall the Blocstop straps and Blocstop.

8) Load test the hoist.

NOTE
General service is now complete. If during the general service damage was discovered proceed as follows.

3-9 Pressure System Replacement {#42227, Pos. 31B}

If damage (such as bent side plates when checked with a straight edge in Figure 326) has occurred to the pressure system by a rope jam, the pressure system must be replaced.

Figure 326

1) Carefully remove the pressure system dowel pin by lifting it straight out its position (Figure 327). Be sure not to damage the pin. If damage does occur, gently remove any burrs with emery cloth.

2) Remove the two 10mm lock nuts and washers on the rear of the gearbox (Figure 328).

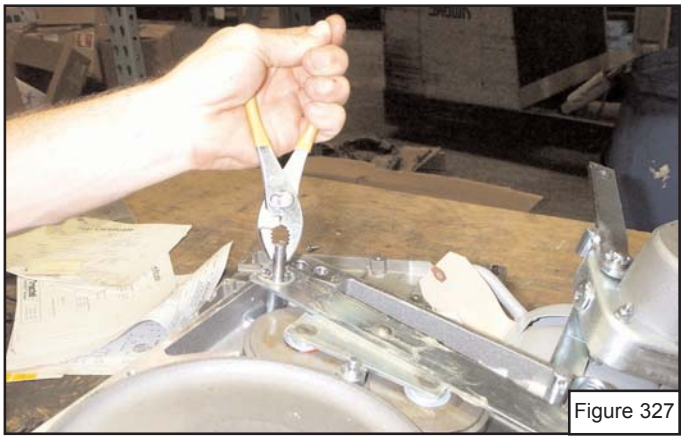


Figure 327

Figure 328

3) Remove the two M6x25 allen screws shown in Figure 329.

NOTE
These screws will still have some tension caused by the pressure system. Be careful NOT to strip them upon removal!

Figure 329

NOTE
Remove both screws evenly at the same time. This spreads the tension properly.

4) Lift the pressure system from the gearbox. Replace the unit (Figure 330).

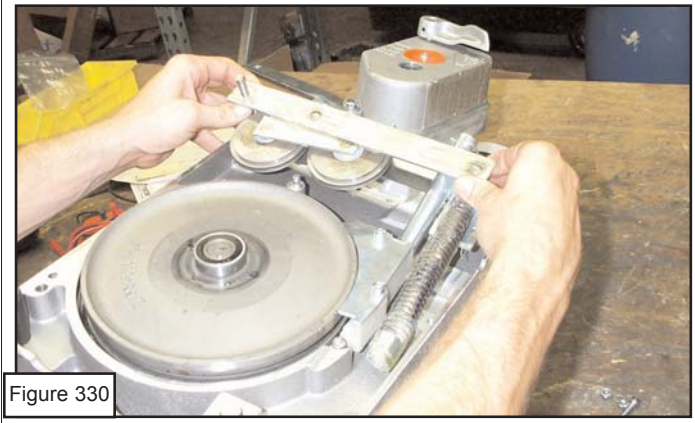


Figure 330

WARNING

It is prohibited to attempt repair of the pressure system at the shop level.

NOTE
The earlier hoist had a THREE-roller system. They are completely interchangeable with a two-roller system as long as a they are of the correct capacity.

5) After removal of the old system replace it with a new unit of the same capacity {#42227, Pos. 31B}.

CAUTION

The earlier pressure systems had the roller assembly rivet off center. If your system has this rivet off center, it MUST BE INSTALLED with the rivet to the low side next to the sheave! See Figure 331.

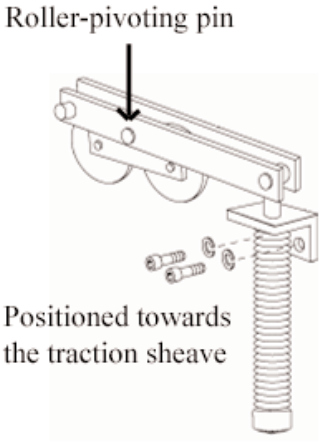


Figure 331

6) Begin by placing the new pressure system in the drive assembly.

7) Install the pressure system dowel pin into the base first (Figure 332).

Figure 332

NOTE
Use a set of channel lock pliers as shown to align the LEFT bolthole.

Figure 333

8) Start installing the LEFT M6x25 allen head screw first!

9) Once LEFT screw is started , begin installing the RIGHT screw. Keep tension on the pressure system with the channel locks as shown (Figure 333).

10) Once the screw threads protrude out of the base install the lock washers and 10mm nyloc nuts.

11) Grease the pressure system as shown in Figure 334 with wheel bearing grease or white lithium grease.

Figure 334

WARNING

DO NOT use molybdenum disulphide (moly-b) grease or graphite type grease!

NOTE:
Code 27187 -
Old style 3-roller pressure system for XE501PA1

Code 42227 -
New style 2-roller pressure system for XE501PA1

Pressure systems are <u>interchangeable.</u>

3-10 Wire Rope Guide Band Replacement {#27217, Pos. 30}

Though replacement is rare, it may be necessary if damaged beyond repair. This procedure requires that the drive sheave is removed.

1) Remove the oil drain plug as shown in Figure 335. Ensure that gearbox is lying with the oil plug to the high side to prevent excessive oil loss. This will allow air pressure to neutralize in the gearbox.

2) Reinstall the oil plug. Do not apply too much torque.

NOTE
You will be removing the oil plug again.

Figure 335

3) Turn the gearbox over so the sheave is face up. Use a block of wood to level the gearbox. Remove the wire rope guiding device (see Section 3-6, step 6).

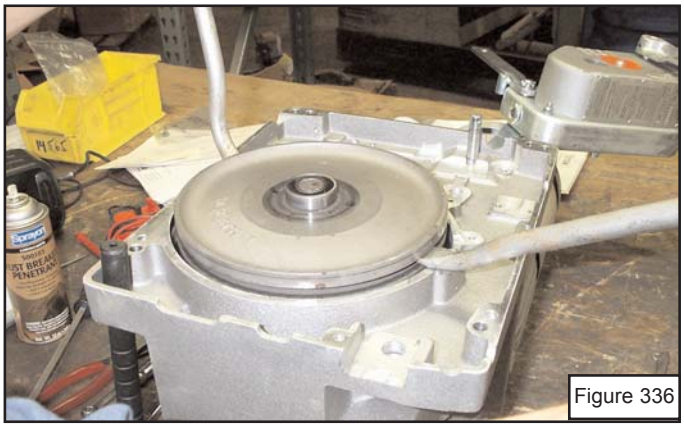


Figure 336

4) Carefully with two pry bars remove the sheave as shown in Figure 336.

5) Remove the two M6x16 allen head screws and the damaged wear band. Inspect and repair the casing base retaining lip as needed (see Section 3-13). Place a light coat of grease on the back of the new wear band.

6) Install the new wear band. Make sure the band sits firmly into the casing base recess as shown in Figure 337 (on the next page).

Figure 337

7) Using vise grips, twist the band into the recess (Figure 338). Tighten the two M6x16 allen head screws.

Figure 338

NOTE
There are no timing marks on the sheave.

8) Reinstall the sheave into the gearbox. There will be resistance due to the air trapped below the sheave.

9) While holding the sheave in place, turn the hoist over so that the oil plug is to the high side again. Remove the oil plug same as before.

10) Press or use a rubber mallet to push the sheave into place. The air will expel from the oil plug. The sheave should move into position as air escapes (Figure 339).

NOTE
DO NOT stand in front of the oil plug hole as oil may spray.

11) Reinstall the oil plug and tighten.

Figure 339

3-11 Radial Packing Ring Replacement {#42016, Pos. 50}

Replacement is only necessary if oil is leaking and the original packing ring is damaged (cut or bent).

1) Remove the oil plug, pressure system, wire rope guiding device and sheave as above.

2) Clean the area carefully.

3) With two pry bars gently remove the old packing ring. Do not damage the base.

4) Lightly grease the new packing ring and place it in its position.

5) Using a brass punch or wooden dowel, tap the packing ring into its position. Tap alternately at the 12-6-9-3 o'clock positions as shown in Figure 340 on the next page.

Figure 340

6) Reinstall the sheave and remove excess air as in Section 3-10.

3-12 Sheave Bearing Replacement {#43906, Pos. 53}

Though this is rarely required proceed as follows.

1) Follow the procedure as above. Do not remove the radial packing ring.

2) Carefully remove the sheave with two pry bars.

3) Inspect both top and bottom bearing for wear or damage (Figure 341).

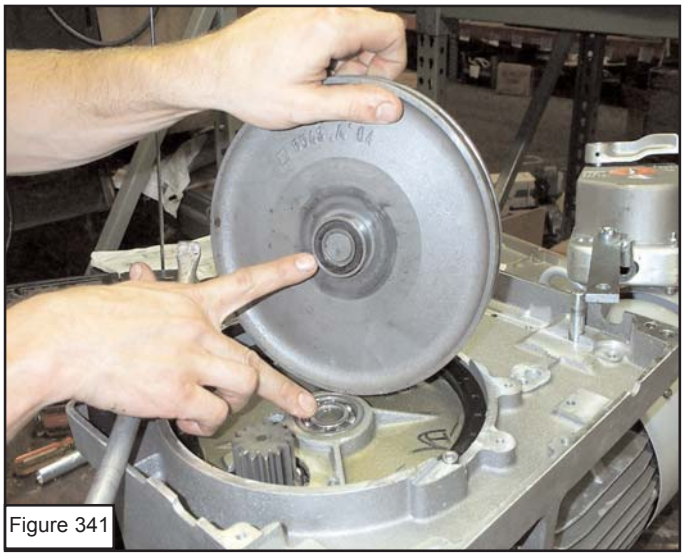


Figure 341

4) If replacement is necessary, using the correct gear puller remove the bad bearing as shown in Figure 342.

Figure 342

5) Reinstall the new bearing and gently seat using a press.

6) Reinstall the sheave. (Follow the procedure as outlined in Section 3-10)

7) Reinstall all drive components as in an outlined in Section 3-7.

8) Reinstall the casing cover per Section 3-8.

3-13 Casing Base Repair - Guideband Area XE501PA1

NOTE
Call TRACTEL for repair kit availability.

Figure 343

Casing and guideband repair is necessary where the aluminum edge above the guideband is damaged or worn (Figure 343 on previous page).

CAUTION

DO NOT dril holes within the marked areas shown in Figure 344!

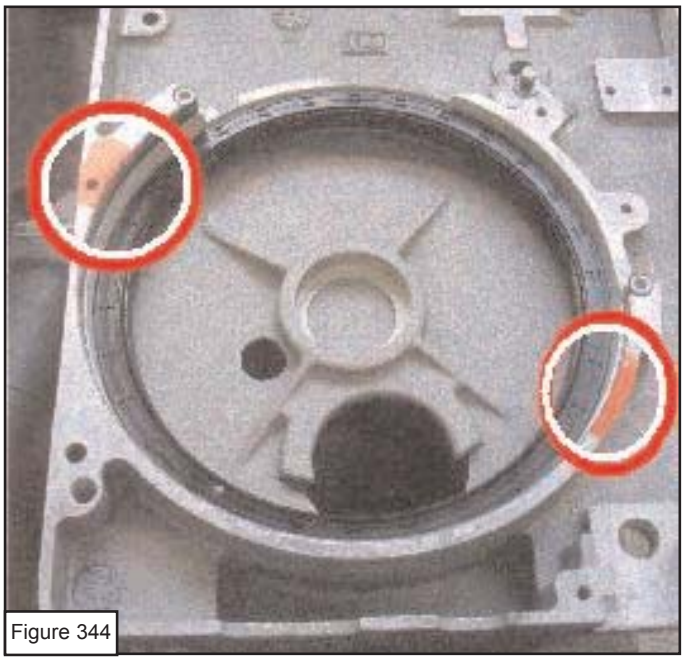


Figure 344

1) Grind off casing as shown in Figure 345 until upper edge of wire rope guiding band looks like Figure 346.

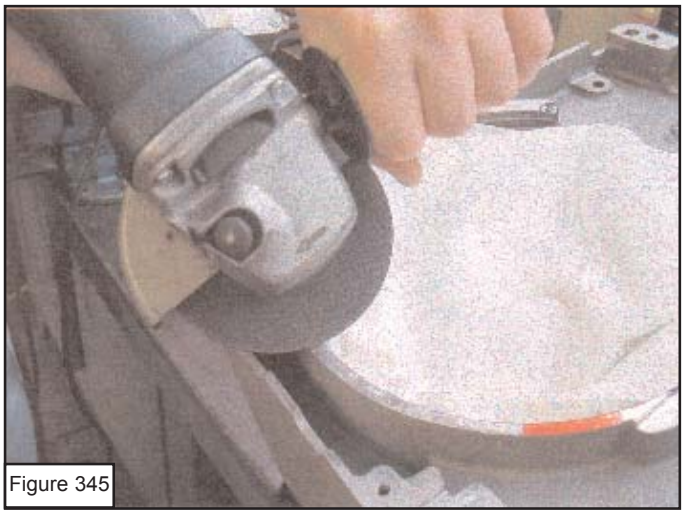


Figure 345

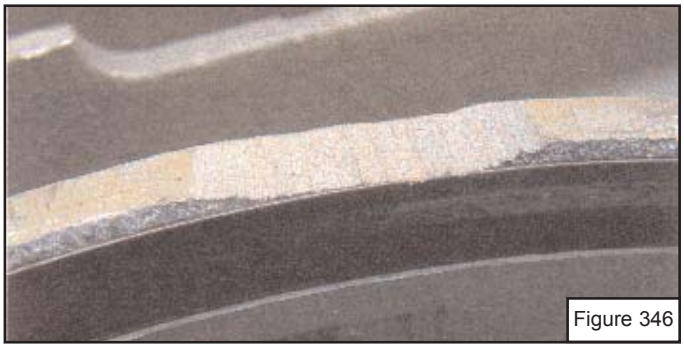


Figure 346

2) Remove the wire rope guiding band using a hex driver as shown in Figure 347.

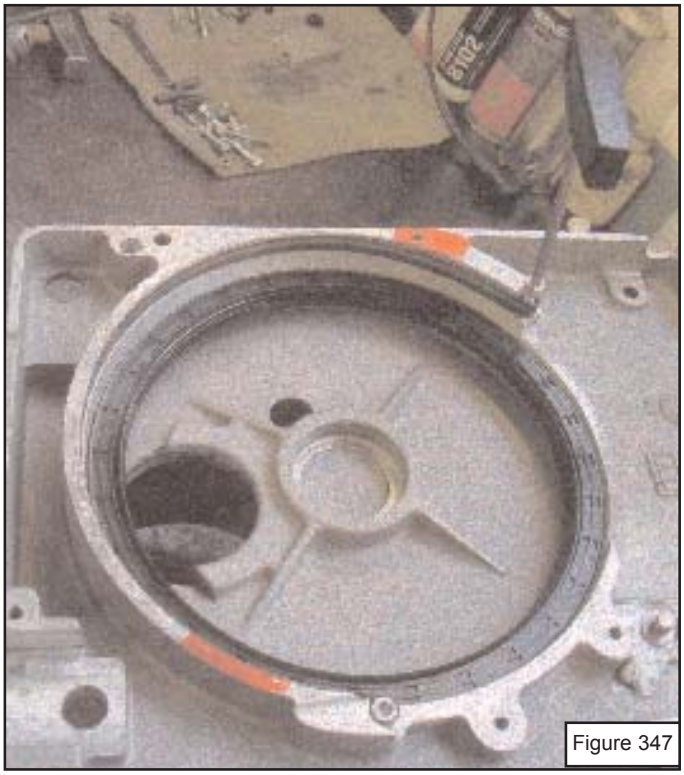


Figure 347

3) Fasten drill guide to casing as shown in Figure 348.

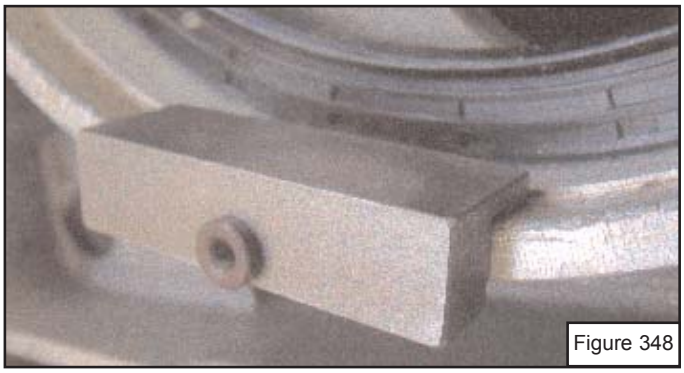


Figure 348

4) Drill a 3.2 mm diameter hole 15 mm deep as shown in Figure 349.

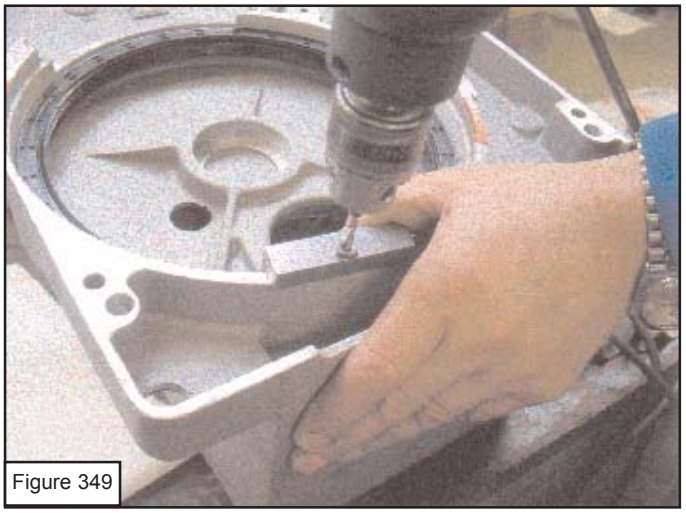


Figure 349

5) Tap a M4 hole 12 mm deep as shown in Figure 350 into the hole that was just drilled.

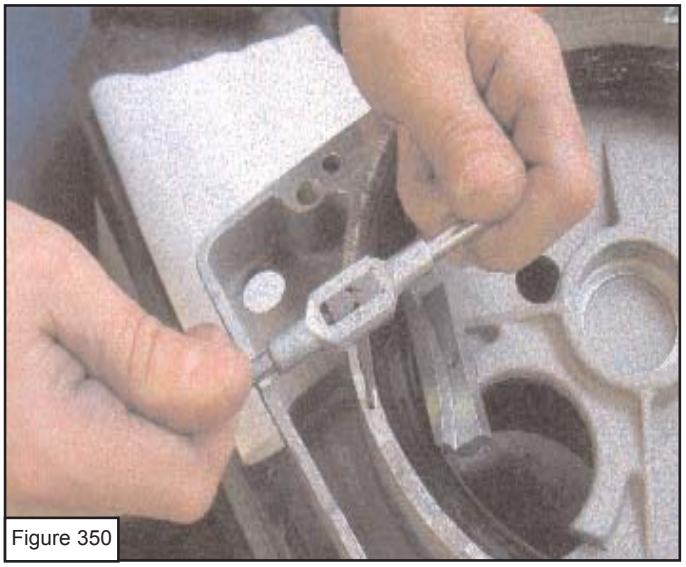


Figure 350

6) Replace the wire rope guiding band shown in Figure 351.

Figure 351

7) Install a M4x10, DIN 933 hex head screw into the casing (Figure 352).

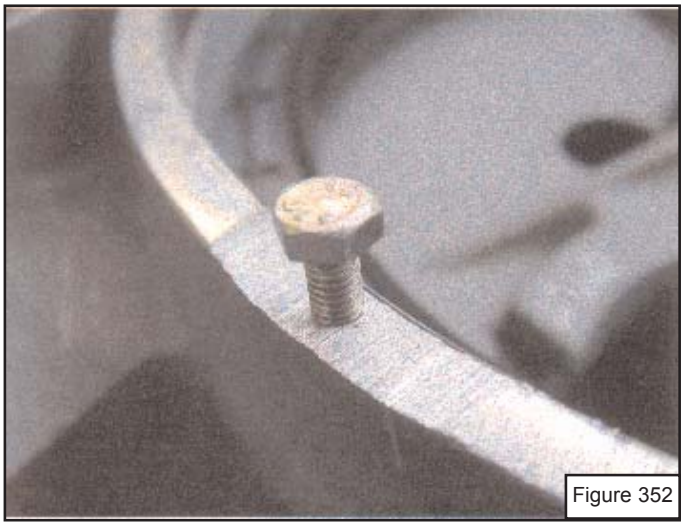


Figure 352

Figure 353

8) Fix screw with Loctite 222 (Figures 353 & 354).

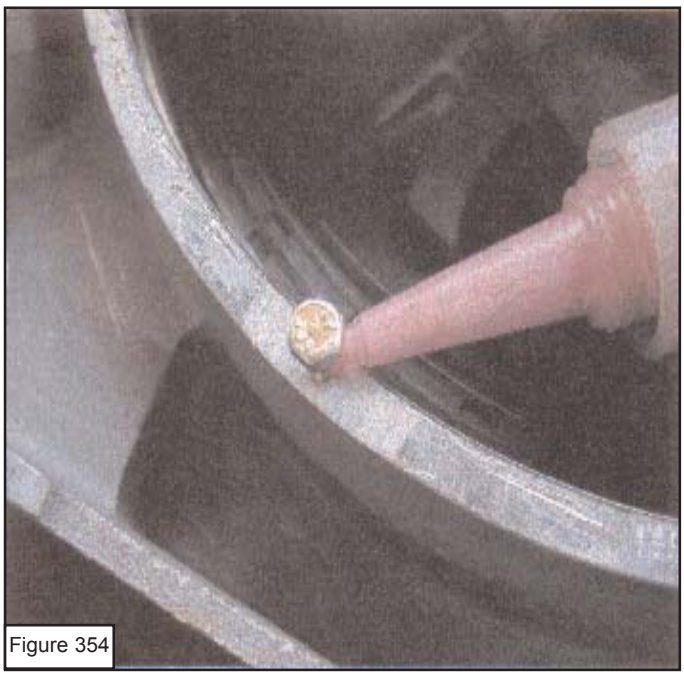


Figure 354

9) Position of screw head is arbitrary as shown in Figure 355.

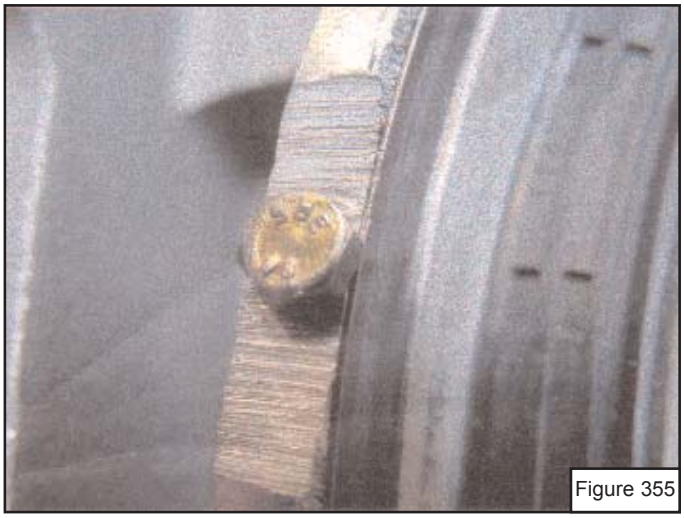


Figure 355

Position of screw head is arbitrary as shown in Figure 356.

Figure 356

3-14 Stirrup Bar Modification XE501PA1

A one piece stirrup bar adapter code 47867 has replaced the two piece adapter that consisted of a pin code 64575 and stirrup bar code 14347.

3-15 Wire Rope Guide Bolt Retrofit XE501PA1

TECHNICAL INFO	INSTALLING THE WIRE ROPE GUIDING BOLT		N°	T-3191
			Edition	1
	200V / 60 Hz Single Phase	for XE501PA1	Date	4/18/03

Instructions

a) Open the Tirak, remove pressure system, driver disk and name plate, if fixed to the the casing cover (A).
b) Machining of the casing cover (A):
- Put on device (C) so that all three straight pins (D) fit into the holes (E) of the casing.
- Using an 8mm three-lipped core drill (supplied) and through the drill bushing (F), drill a hole into the casing cover.
c) Machining of the casing base (B):
- Put on device (C) so that all three straight pins (D) fit into the holes (E) of the casing.
- Using an 8mm three-lipped core drill (supplied) and through the drill bushing (F) drill a hole of minimum 34mm depth into the casing base.
d) Install the driver disk and pressure system.
e) Fit wire rope guiding bolt (G).
f) Check the distance (X) and fit correct number of adjusting washers (H).
g) Close the casing and put on the name plate, if removed under a).

Distance X [mm]	Number of adjusting washers [8x14x1]
17	0
18	1
19	2
20	3

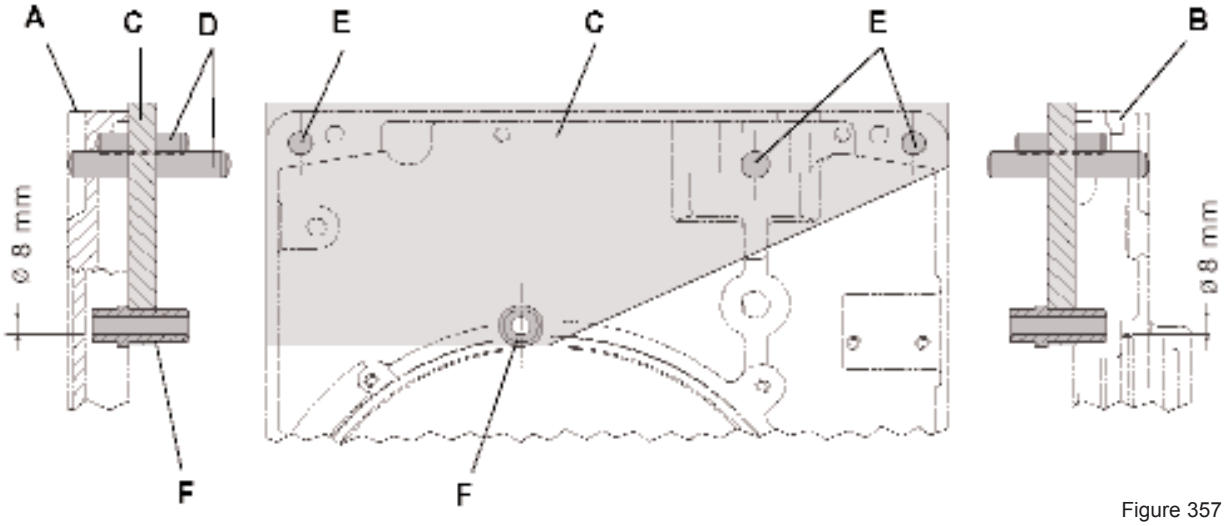
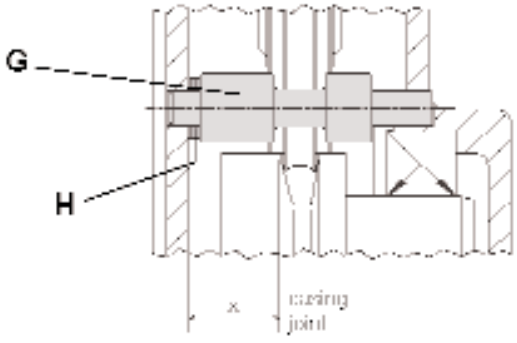


Figure 357

Replacement Parts
Wire rope guide bolt (for retrofit version ONLY) #78755 Washer (8x14x1 DIN 988) #67206



Hoist Serial Numbers
Guide bolt (#74875) is factory installed on all XE501PA hoists beginning with S/N 20106 The following hoist can be retrofitted: XE501PA S/N 8377 & up

3-16 Wire Rope Drive System Parts List XE501PA1 (Page 1 of 2)

Spare Parts	Drawing	19600	WIRE ROPE DRIVE		N°	E-3051
	List				Edition	8
	State	18.01.00	200V / 60 Hz Single Phase	for XE501PA1	Date	4/18/03

Pos.	Code #	Qty.	Designation	Specification
–	18468	–	Wire Rope Drive / Gearbox	XE501PA1 (ø 5/16 inch, 8mm)
2	43775	1	Casing Cover	–
4A	36307	1	Driver disk	ø 5/16 inch, 8mm
11	43825	1	wire rope exit tube	–
12	43835	1	wire rope entry tube	–
13	43865	1	wire rope guding device	–
14	43855	1	upper wire rope guiding plate	–
15	43845	1	lower wire rope guiding plate	–
21	40335	1	carrying handle	–
25	21246	1	centrifugal brake	1500 U/min
27	43026	1	o-ring	82x3
30	27217	1	wire rope guding band complete	–
31B	42227	1	pressure system complete	XE501PA1 > N° 837
33A	21940	2	gearbox oil	HPO 85 W/140GL5
39	41976	1	shaft seal	200/230/15
40	37686	1	shaft seal	BA 20/47/7 DIN 3760
41	41986	1	cup seal	–
45	536	1	snap ring	20x1.2 DIN 471
50	42016	1	ball bearing	20/52/15 DIN 625
53	43906	1	ball bearing	20/42/12 2RS DIN 625
57	6846	2	snap ring	15 DIN 6799
59	43056	1	key	B 6x6x25 DIN 6885
60	39366	4	roll pin	8 x 30 DIN 7346
62A	37646	1	casing screw	M 16 x 1,5 DIN 908
63	37656	1	cu gasket	16, 2/24x1, PA6
64	28956	2	hex screw	M 10x90 DIN 931
65	4186	2	socket head cap screw	M 6 x 16 DIN 912
67	4176	4	socket head cap screw	M 6 x 20 DIN 912
69	12016	6	socket head cap screw	M 6 x 50 DIN 912
70	5336	3	socket head cap screw	M 6 x 30 DIN 912
71	7146	2	socket head cap screw	M 6 x 25 DIN 912
73	16616	17	spring washer	A 6 DIN 127
74	39356	4	square nut	M 6 DIN 557
75	–	1	name plate	–
76	16236	4	grooved drive stud	2 x 6 DIN 1476
79	7996	2	self-locking hex. Nut	M 6 DIN 985
83	1166	3	cap	–
84	47867	1	stirrup adapter with anchoring pin	XE 501PA1 > N° 7695
85	67746	1	cup	–
86	43885	1	pin	–
87	43895	1	bushing	–
100	29367	1	casing base with brake ring and treaded insert	–
100.1	29377	1	casing base with gear box	XE501PA1
102	14347	1	emergency descent handle with fixing wire rope	–
103	12306	4	socket head cap screw	M8x25
103.1	8966	4	lock washer	M8
184	46647	1	set of straps for BLOCSTOP BSO 500	–
184.1	46637	1	strap 170.5 with support	–
184.2	45735	1	pin on BLOCSTOP	–
184.3	58035	1	pin on TIRAK	–
184.4	9816	6	washer	13x19x1 DIN 988
184.5	4646	4	cotter pin	4x20 DIN 94
184.6	66785	1	strap 170.5	–
200*	74975	1	wire rope guiding bolt	–

* XE501PA1 > N° 20106

3-16 Wire Rope Drive System Parts List XE501PA1 (Page 2 of 2)

Spare Parts	Drawing	19600	WIRE ROPE DRIVE		N°	E-3051
	List				Edition	8
	State	18.01.00	200V / 60 Hz Single Phase	for XE501PA1	Date	4/18/03

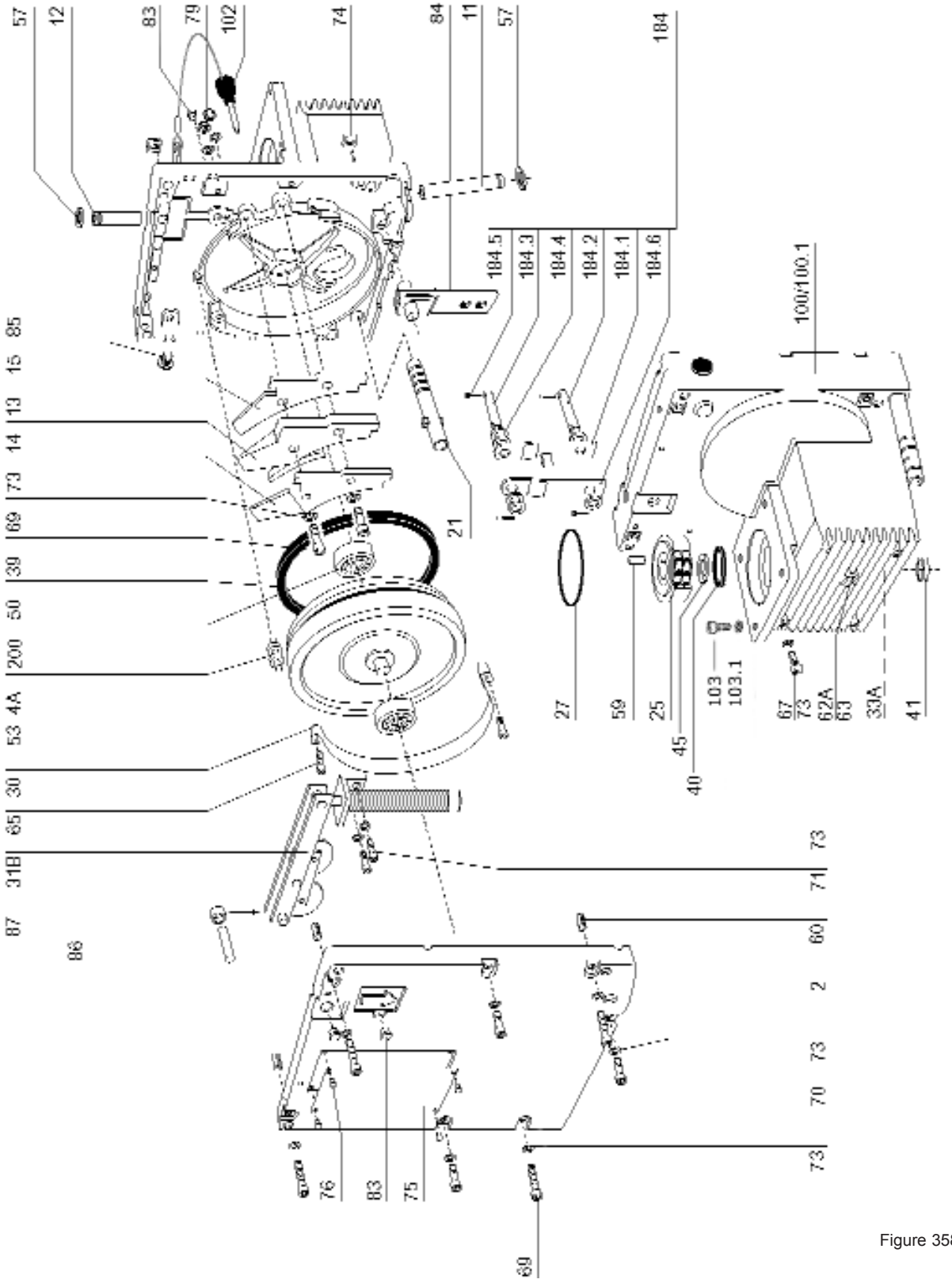


Figure 358

4) GEARBOX

4-1 Tools Required (Figure 401)

Figure 401

- Allen keys 8 mm, 5 mm
- internal and external snap ring pliers
- 2 pry bars
- 2 screwdrivers
- 1 gear puller
- 1 rubber mallet
- 1 adjustable wrench
- 1 brass punch
- 1 ballpin hammer
- Silicone sealant

4-2 Gearbox Disassembly

The following procedure is for complete disassembly of the gearbox. We recommend that the procedure be carried out by a Tirak repair facility. If repair is essential at the site proceed as follows:

1) Remove motor - See Section 6-1 and disassemble the wire rope drive/gearbox (see Chapter 3).

2) Remove the controlled descent brake and its key.

3) Remove the oil plug and copper gasket. Drain the oil completely into a clean bucket. Inspect the oil for brass flakes or metal shavings which indicates wear {#37646, Pos 62A, Figure 402}.

Figure 402

4) Remove the 4 socket head screws M6X20 {#4176, Pos. 67} in the 4 corners of the cover and carefully pry the cover off with 2 screwdrivers (See Figure 403 #43785, Pos. 3).

Figure 403

5) Gently pry the gearbox cover from the base as shown in Figure 404.

Figure 404

6) Gently pry the sheave from the base (Figure 405). Be careful not damage the wire rope guide band.

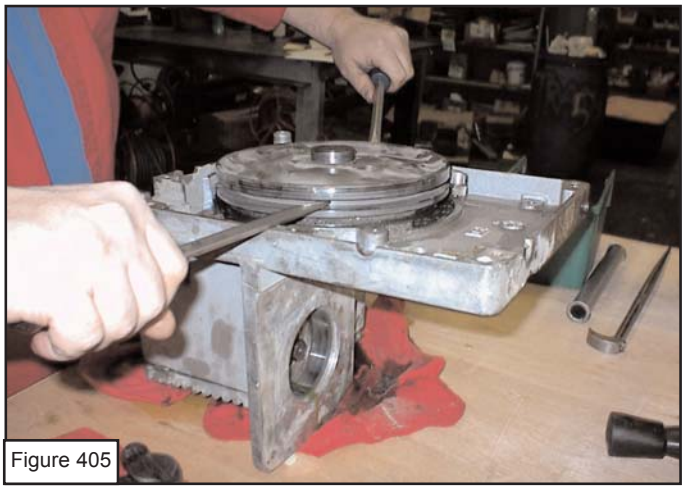


Figure 405

7) Remove the carrying handle from the hoist (Figure 406).

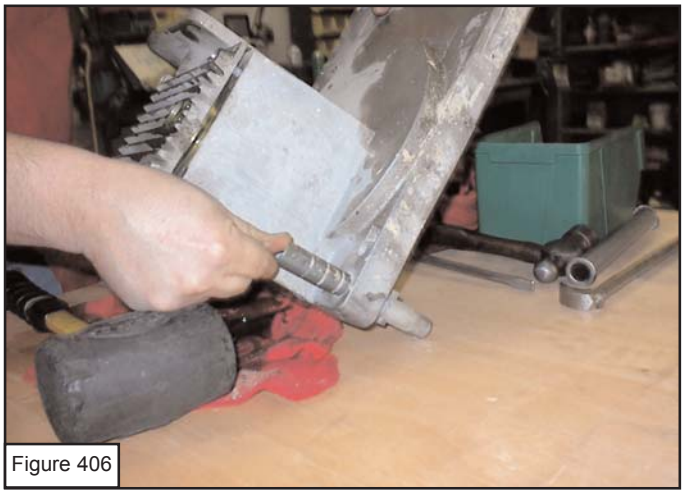


Figure 406

8) Remove the snap ring which sits above the seal on the input shaft (See Figure 407, #536, Pos. 45).

Figure 407

9) Remove the seal #37686, Pos. 40. The seal is destroyed during removal and must be replaced after reassembly of the gearbox.

Figure 408

10) Remove the large internal snap ring {#8976, Pos. 46} below the shaft seal (Figure 409).

Figure 409

11) Remove any and all spacers {#25936, Pos. 55} below the internal snap ring (Figure 410).

Figure 410

NOTE:
There may be more than one spacer below the internal snap ring.

12) Carefully turn the gearbox over and remove the cup seal {#41986, Pos. 41} at the bottom of the Tirak (See Figure 411). Dispose of the old seal.

Figure 411

13) Remove the internal snap ring {#43036, Pos. 56} under the cap seal in Figure 412.

Figure 412

14) Using a rubber dead blow mallet, hit the bull gear as shown in Figure 413. After several careful hits the bull gear assembly should come out through the front of the gearbox.

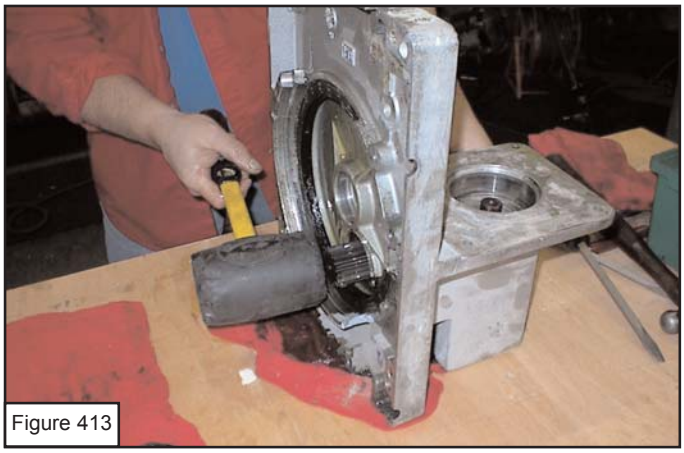


Figure 413

15) Remove the bull gear as shown in Figure 414 after completing step 12.

Figure 414

16) Inspect the brass gear for any wear or damage (Figure 415). Replace if necessary.

Figure 415

17) Inspect the steel bull gear and bearing for any wear, damage or discoloration (Figure 416).

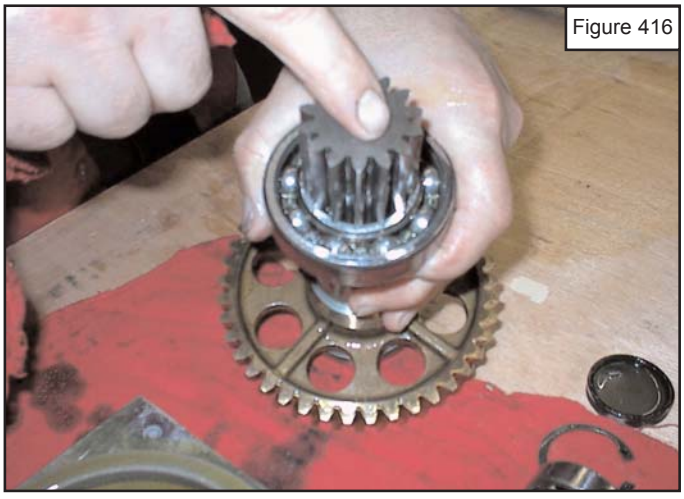


Figure 416

18a) If a press is available (if not, refer to step 17b), carefully press the complete worm gear assembly from the top of the gearbox out the bottom of the gearbox as shown in Figure 417.

Figure 417

18b) Carefully tap the worm gear assembly with a rubber mallet from the top of the base out the bottom of the base as shown in Figure 418.

Figure 418

19) Once the wear gear assembly exits the bottom of the gearbox, install a suitable gear puller (Figure 419).

Figure 419

20) Remove the lower bearing as shown in Figure 420.

NOTE:
Before removing the bearing from the worm gear, notice it's orientation! It must be reinstalled in the same orientation.

Figure 420

21) Remove the worm gear and upper bearing through the front of the casing base (Figure 421).

Figure 421

22) Inspect the worm gear for wear, damage, or discoloration (ie. blueing) as in Figure 422.

Figure 422

23) Lay all the internal gear components on a clean area in the order of removal (Figure 423). Inspect the upper and lower bearings for wear or damage. Replace if necessary.

Figure 423

4-4 Gearbox Reassembly

NOTE:
Prior to reassembly, carefully clean the new casing base to ensure no filling, dirt or debris are present (Figure 424).

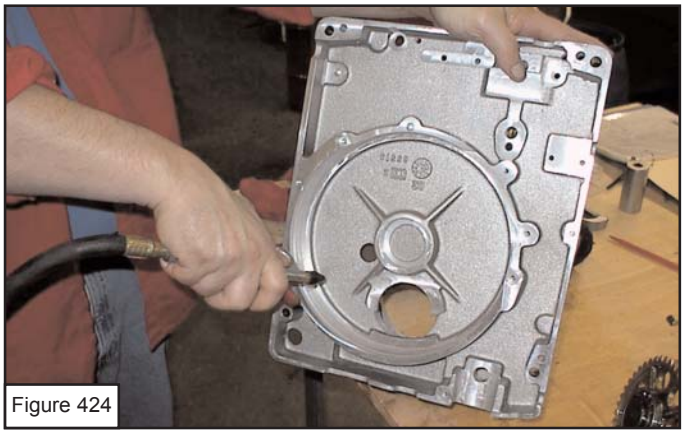


Figure 424

1) Install the upper worm gear bearing about halfway on the worm gear towards the upper end of the shaft (Figure 425).

Figure 425

2) Carefully install the upper bearing and worm gear into the top of the gearbox base (Figure 426).

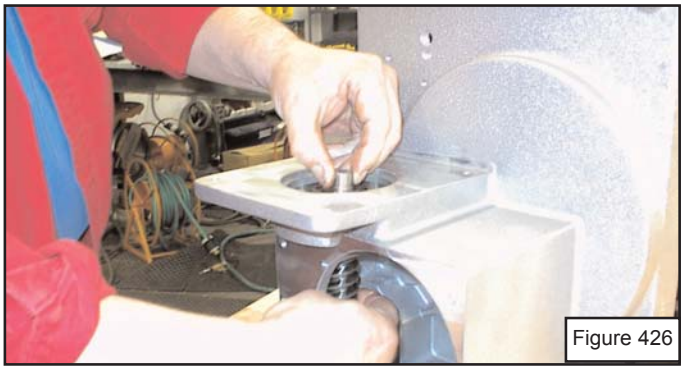


Figure 426

NOTE:
If a machine press is available, it will ease the installation of the worm gear.

3) If a press is not available, a hollow tube and a rubber mallet may be used carefully to tap the bearing and worm gear in the base as shown in Figure 427.

Figure 427

3) Install the bull gear assembly as shown in Figure 428.

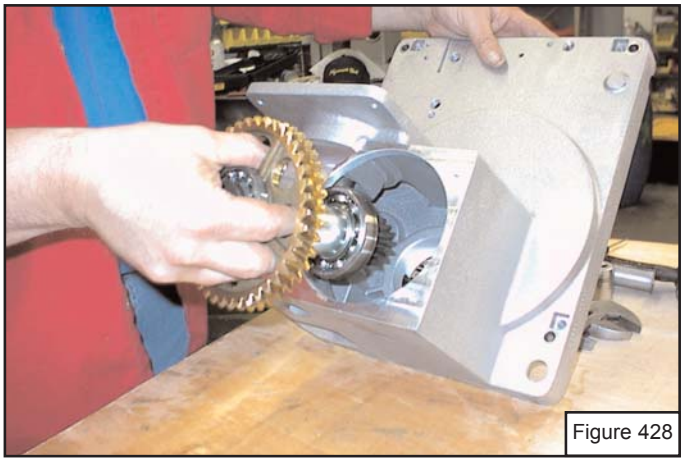


Figure 428

4) If a press is not available, carefully tap the bull gear into position as shown in Figure 429.

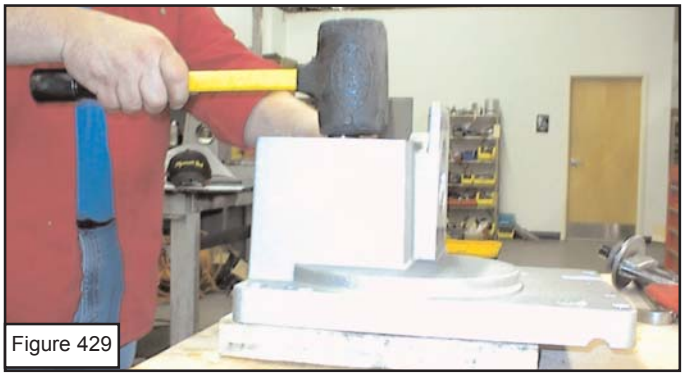


Figure 429

5) Alternate tapping the bull gear and the worm gear. After several careful taps, they should mate.

NOTE:
The bull gear is fully installed when the bearing meets the casing base as shown in Figure 430.

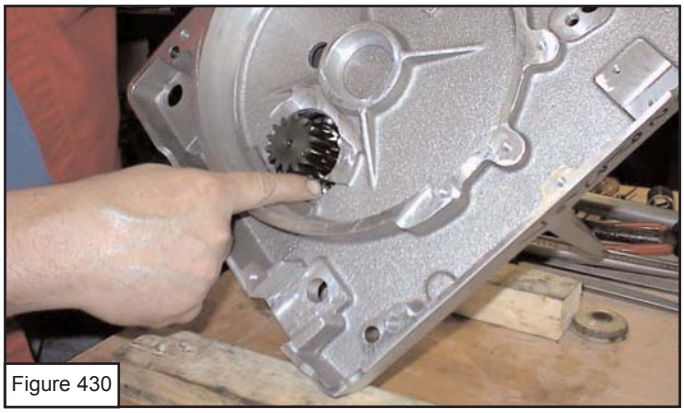


Figure 430

6) Check for free rotation of both the worm gear and bull gear (Figure 431). They should both move freely with a slight amount of backlash (slight play or space between the gears).

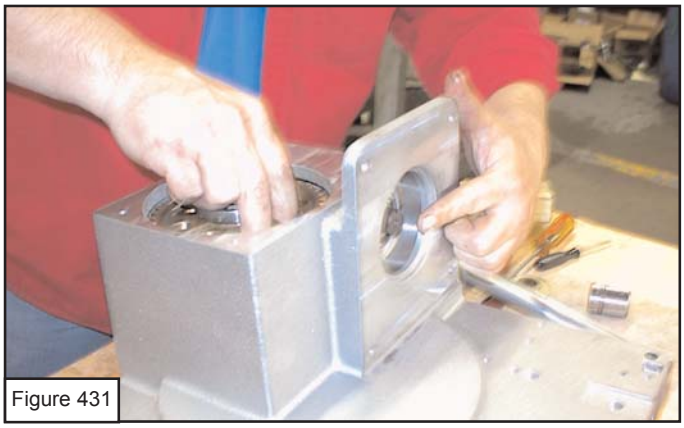


Figure 431

7) Using a hollow tube or press, install the upper worm gear bearing below the slot in the base for the internal snap ring (removed in step 7 of Section 4.3) shown in Figure 432.

Figure 432

NOTE:
Push the bearing down until it is below the slot shown in Figure 433.

Figure 433

8) Install any and all spacers removed in step 11 of Section 4.3, Figure 410.

9) Install the internal snap ring removed in step 10 of Section 4-3, Figure 434. Ensure the internal snap ring is completely seated into the base. Tap it gently with a brass punch.

Figure 434

10) Turn the gearbox over. The lower worm gear should be in the center of the gearbox base as shown in Figure 435.

Figure 435

11) Carefully install the lower worm gear bearing into the base (Figure 436).

Figure 436

CAUTION

The orientation must be the same as in step 19 of Section 4-3.

12) Using a suitable punch or press, tap the lower bearing onto the worm gear (Figure 437). Ensure that the bearing seats onto the lower worm gear as shown in step 10.

Figure 437

13) Install the lower internal snap ring and all spacers below it removed in Step 13 of Section 4-3, Figure 412.

14) Repeat Step 6 of the gearbox reassembly. Check for free rotation of both the worm gear and bull gear.

15) Inspect both the brass gear and worm gear for alignment and damage (Figure 438).

Figure 438

16) Turn the gearbox over. Slightly grease the cup seal and prepare to install it (Figure 439).

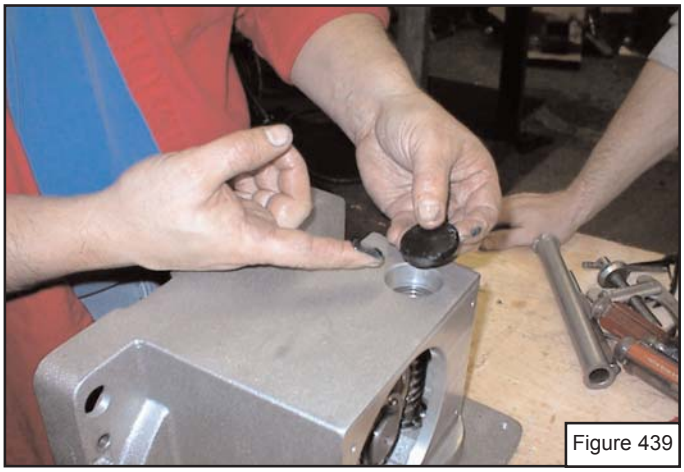


Figure 439

17) Using a suitable punch, either press or tap the cup seal into the base (Figure 440 on the next page). Continue tapping carefully until the seal meets the internal snap ring installed in Step 9.

Figure 440

NOTE:
The cup seal should be recessed into the base as shown in Figure 441.

Figure 441

18) Install the radial packing ring. The ring should mount into the base to the shoulder indicated in Figure 442 (See Section 3-11).

Figure 442

19) Using the “hollow tube”, tap or press the upper shaft seal into place shown in Figure 443.

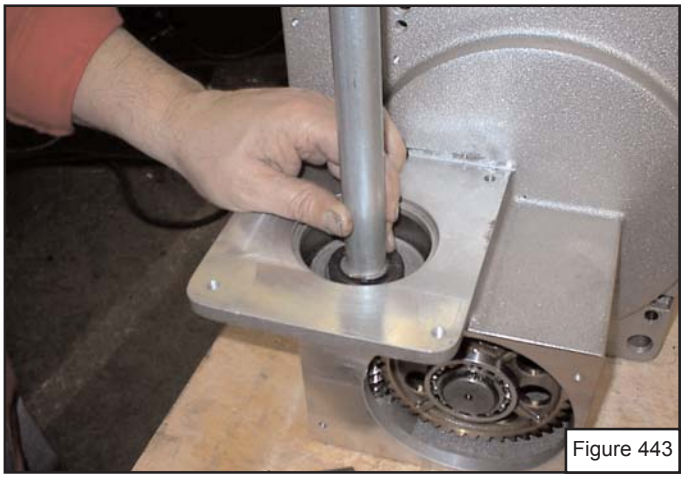


Figure 443

20) Install the worm gear external snap ring as shown in Figure 444.

Figure 444

21) Inspect the sheave and bearings prior to installation (Figure 445).

NOTE:
There are no timing marks on the X-Series sheaves.

Figure 445

22) Prior to installation, lightly grease the backside of the wearband to prevent corrosion (Figure 446).

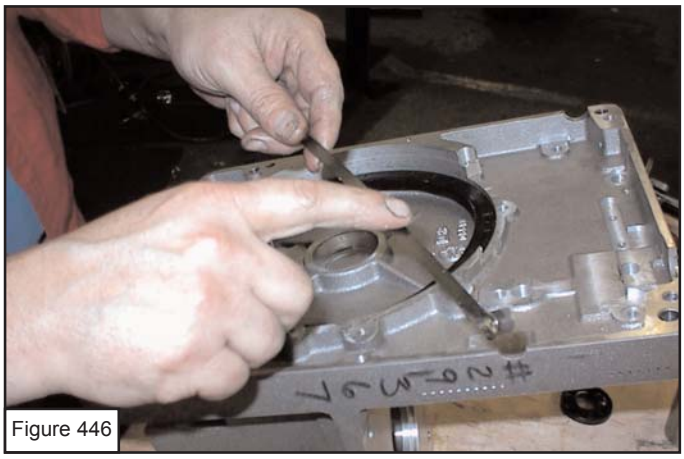


Figure 446

23) Install the wearband into the recess of the gearbox case (Figure 447).

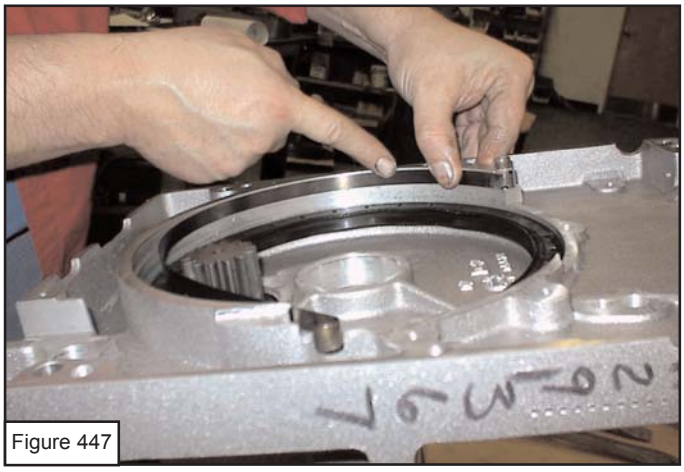


Figure 447

24) Using channel locks, press the wearband into the recess as shown. Install the soc. heap screw as shown in Figure 448.

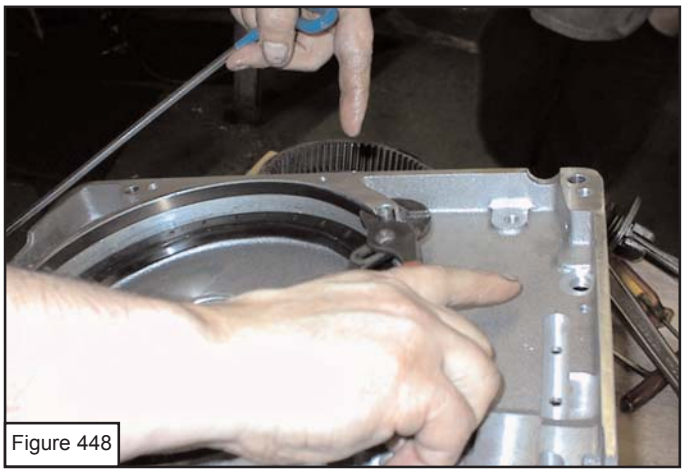


Figure 448

25) Using needle nose pliers, hold the wearband onto the recess. Using channel locks, press the wearband into the recess as shown in Figure 449. Install the second socket head screw.

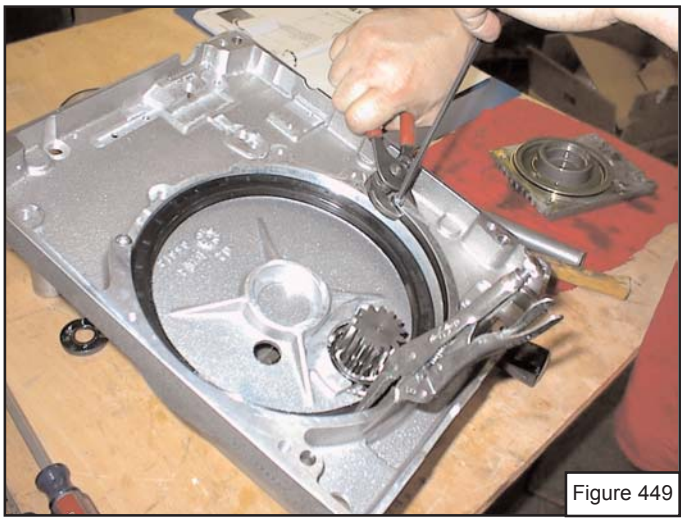


Figure 449

26) Grease the radial packing ring prior to installing the sheave. Gently press the sheave into place. Continue pressing the sheave into the base until the “V” groove of the sheave is opposite the wearband as shown in Figure 450.

27) Replace the O-ring in the gearbox casing cover. Lightly grease the O-ring prior to installation (Figure 450).

Figure 450

28) Lightly coat the 4 socket head screws with silicon prior to installation (Figure 451). Tap the cover onto the base and tighten the screws down.

Figure 451

29) Fill the gearbox with 2.0 liters of SAE 85W/140 GLS gear oil. Do not overfill the gearbox! Refer to Section 4-5.

30) Install the oil plug and gasket (Figure 452).

Figure 452

31) Restamp or mark the gearbox with the serial number of the hoist in the location shown in Figure 453.

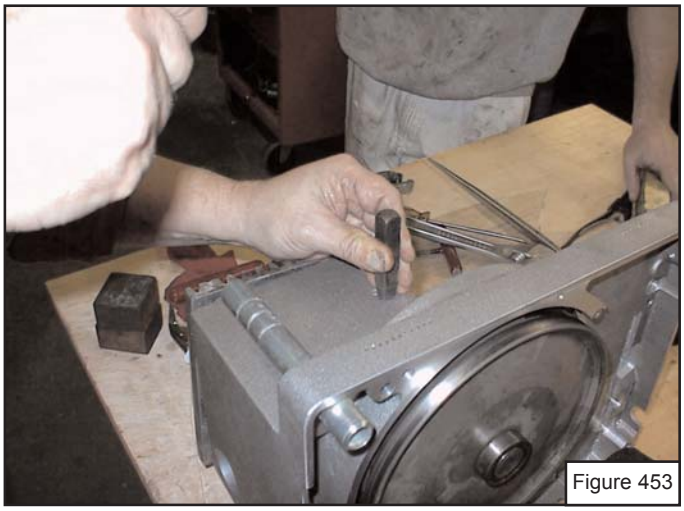


Figure 453

NOTE
Overhaul of the hoist gearbox is now complete.

WARNING

The hoist must be load tested prior to returning to service. Check the hoist for abnormal noise, vibration or heat.

4-4 Hoist-Position for Oil Level Inspection

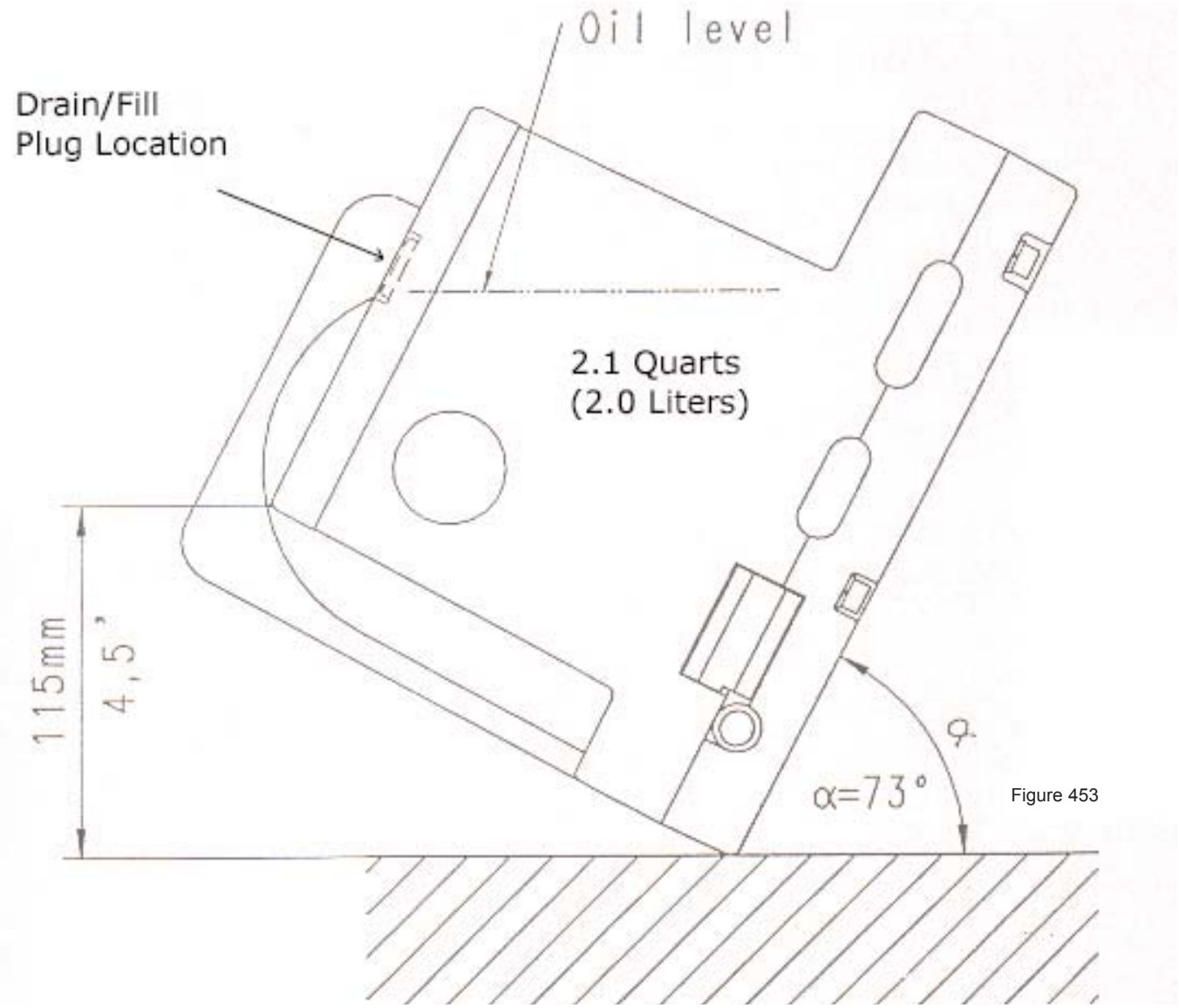


Figure 453

Type:

SAE 85W/140 GLS

Examples:

BP Hydrogen EP90
SHELL Spirax HD90
TEXACO Multigear EPG S80 W90

4-5 Gearbox Parts List XE501PA1 (Page 1 of 2)

Spare Parts	Drawing	19600	GEARBOX		N°	E-3207
	List				Edition	1
	State	06.09.01	200V / 60 Hz Single Phase	for XE501PA1	Date	4/18/03

Pos.	Code #	Qty.	Designation	Specification
-	29377	1	casing base without gears	XE501PA1
1	29367	1	casing base with gears + pos. 30	-
3	43785	1	gearbox cover	-
5	27167	1	shaft pinion	-
6	43795	1	worm wheel	-
7	27177	1	worm shaft	-
8	43805	1	distance tube	36x40x57,5
30	27217	1	wire rope guiding band	-
33A	21940	2	gearbox oil XE501PA1	HPO 85 W/140GL5
34	25906	2	adjusting washer	35x45x1 DIN 988
34.1	41936	1	adjusting washer	35x45x0,1 DIN 988
34.2	41946	1	adjusting washer	35x45x0,2 DIN 988
34.3	41956	1	adjusting washer	35x45x0,3 DIN 988
34.4	41966	1	adjusting washer	35x45x0,5 DIN 988
39	41976	1	radial packing ring	200x230x15 DIN 3760
40	37686	1	radial packing ring	BA 20x47x7 DIN 376
41	41986	1	cup seal	40x7
42	39976	1	o-ring	130x3 DIN 3770
44	36026	1	snap ring	A 17x1 DIN 471
45	536	1	snap ring	A 20x1,2 DIN 471
46	8976	1	snap ring	J 47x1,75 DIN 472
47	7256	1	snap ring	A 35x1,5 DIN 471
48	42006	1	ball bearing 6203	17x40x12 DIN 625
49	37426	1	ball bearing 6204	20x47x14 DIN 625
50	64186	1	taper roller bear 30204	20x47x15,25 DIN 720
51A	42026	1	ball bearing 6207 XE501PA1	35x72x17 DIN 625
52	42036	1	ball bearing 16007	35x62x9 DIN 625
55	25936	1	adjusting washer	37x47x1 DIN 988
56	43036	1	snap ring	J 40x1,75 DIN 472
58	43046	1	key	B 8x7x30 DIN 6885
62A	37646	1	casing screw XE501PA1	M 16x1,5 DIN 908
63	37656	1	cu gasket	A 16 x22x1,5 DIN 7603
65	4186	2	socket head cap screw	M 6x16 DIN 912
67	4176	4	socket head cap screw	M 6x20 DIN 912
73	16616	4	spring washer	A 6 DIN 127

1) To compensate for eventual clearance between distance tube (8) and/or whornwheel (6) and ball bearing (52) (XE501PA1).

4-5 Gearbox Parts List XE501PA1 (Page 2 of 2)

Spare Parts	Drawing	19600	GEARBOX		N°	E-3207
	List				Edition	1
	State	06.09.01	200V / 60 Hz Single Phase	for XE501PA1	Date	4/18/03

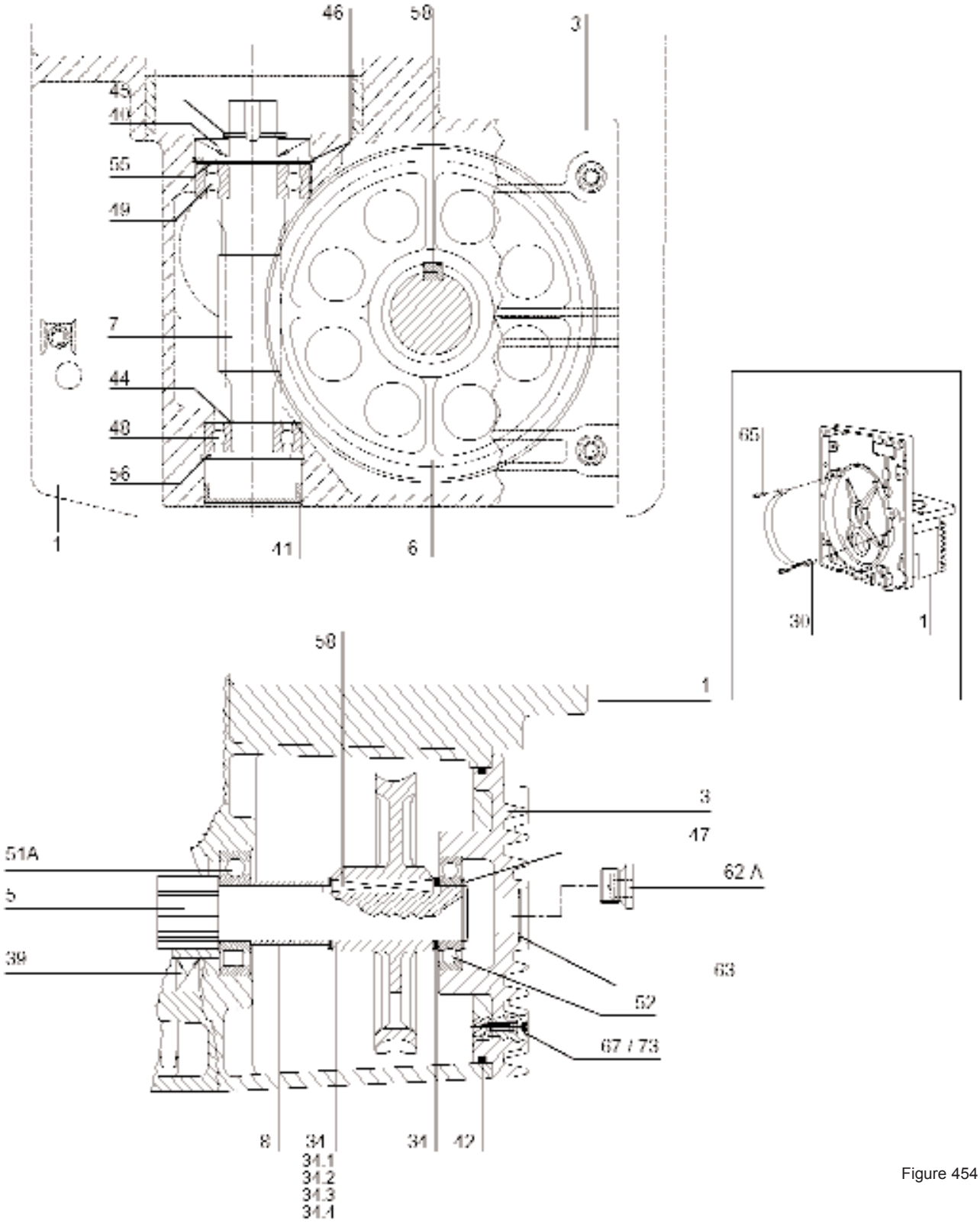


Figure 454

5) PRIMARY BRAKE FOR MOTOR

WARNING

Upon completion of any brake maintenance, it is mandatory that a load test of the hoist be completed!

5.1 Brake Types

All Tirak hoists since 1997 are fitted with the adjustable Precima type brake. This section covers the service and repair of this brake only. The XE501PA1 has a 96 VDC brake. Prior to maintenance, verify the brake voltage. This voltage is stamped on the brake nameplate, printed on the wiring diagram (Figure 501), located on the fan cover (Figure 502), and is stamped on the top of Precima brakes (Figure 503).

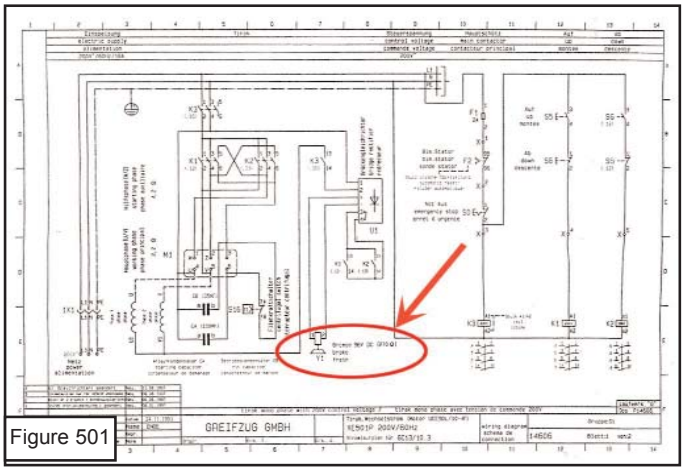


Figure 501

Figure 502

Model XE 501PA1 series hoists starting with serial number 5412 are fitted with the Precima type brake.

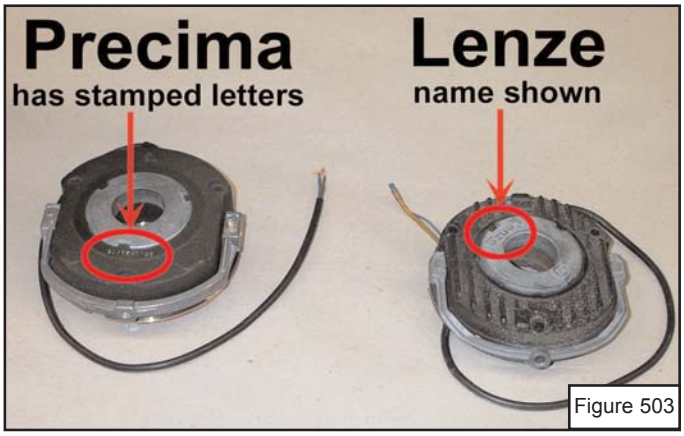


Figure 503

All Tirak with serial numbers before those listed above were fitted with the non-adjustable Lenze type brake. Though most of the troubleshooting checks and procedures are the same, contact Tractel Inc. for exact service details.

NOTE:
The Lenze type brake may be exchanged with the Precima brake. However, you must exchange all of the brake components and file the plastic fan to reduce the thickness and avoid contact with the brake.

5.2 Tools Required (Figure 504)

- 5 mm Allen key
- Snap-ring pliers
- 10 mm wrench
- 8 mm wrench
- 2 Flat screwdrivers
- Silicone (RTV) sealant
- Tape
- Calipers or micrometer
- Feeler gauges

Figure 504

5.3 Brake Inspection

1) Remove the fan cover as shown in Figure 505. If crushed, replace and ensure that the fan spins unobstructed (Figure 506).

Figure 505

Figure 506

2) Inspect the inside of the fan cover for excessive brake dust (Figure 507). This indicates brake wear caused by an incorrectly adjusted brake or possibly low voltage usage. It may also be an indication of excessive EMERGENCY DESCENT usage.

Figure 507

3) Measure the clearance (a) between the pressure plate and the black brake body with a feeler gauge. This should be done in all three places between the 3 fixing screws every 120 degrees (Figure 508).

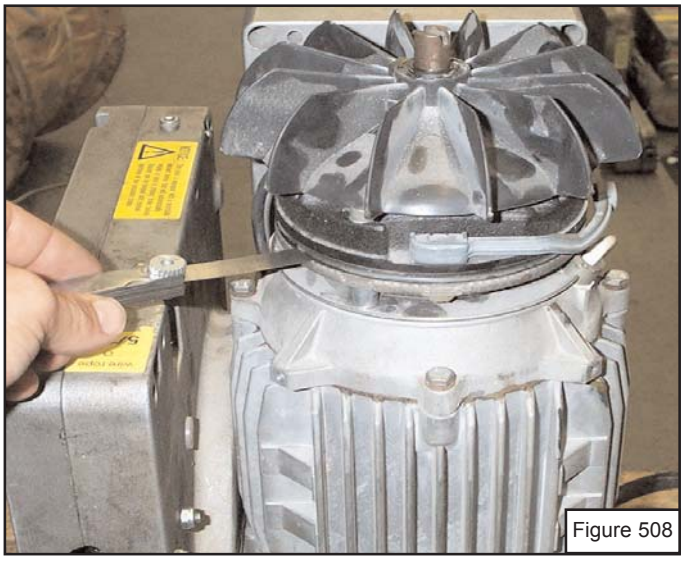


Figure 508

4) Measurement of the air gap (a) should be 0.012"(0. 3mm) (Figure 509 and Figure 510).

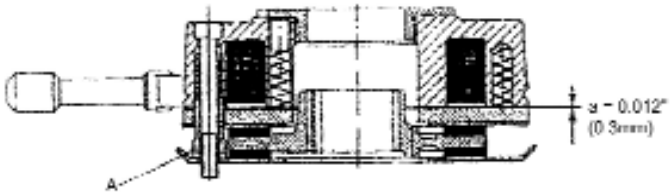


Figure 509

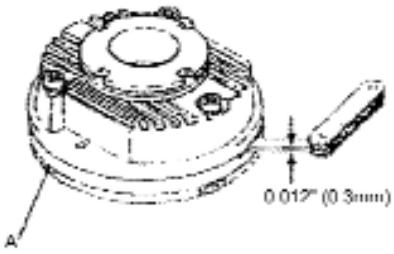


Figure 510

5.4 Brake Removal

NOTE:
Prior to removal, pay attention to the brake orientation and mark it for realignment (Figure 511).

Figure 511

1) Remove the fan snap ring {#3866} shown in Figure 512.

Figure 512

2) Remove the fan {#16186} with two screwdrivers placed under the fan and against the motor shaft and pry upward (Figure 513).

Figure 513

3) If the fan key {#16256} is removable, do so. If not, just wrap some tape around the keyway for safety (Figure 514,515).

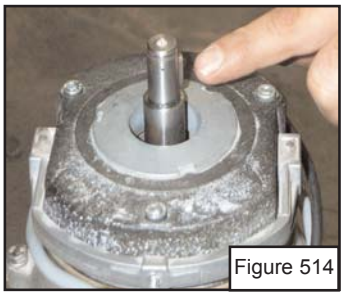


Figure 514

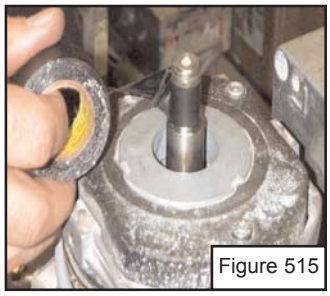


Figure 515

4) Remove the three socket head fixing screws w/ locking washers.

5) Remove the whole brake assembly (Figure 516).

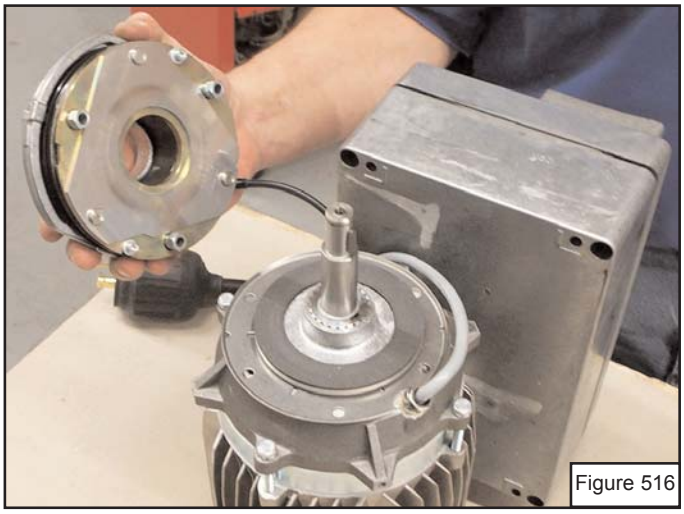


Figure 516

NOTE:
It is not necessary to unwire the brake.

6) Remove the brake disc {#47446} and inspect it (Section 5-5). Replace if worn or damaged.

7) If the brake hub {#47456} needs replacement, remove the snap ring {#536} and carefully pry the hub from the motor shaft as shown in Figure 517.

Figure 517

NOTE:
Care must be taken when replacing the hub not to damage it. This will damage the motor.

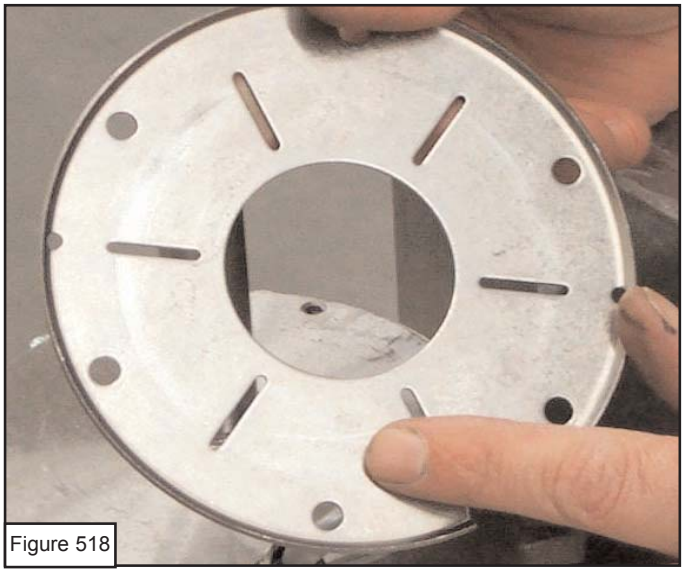


Figure 518

8) Inspect the friction plate {#35816} for wear (Figure 518). Replace all worn or damaged components.

NOTE:
Prior to reassembly, it is MANDATORY that the 3 brake end shield holes have silicone applied to seal the screws. This must be done to prevent water entry into the motor (Figure 519).

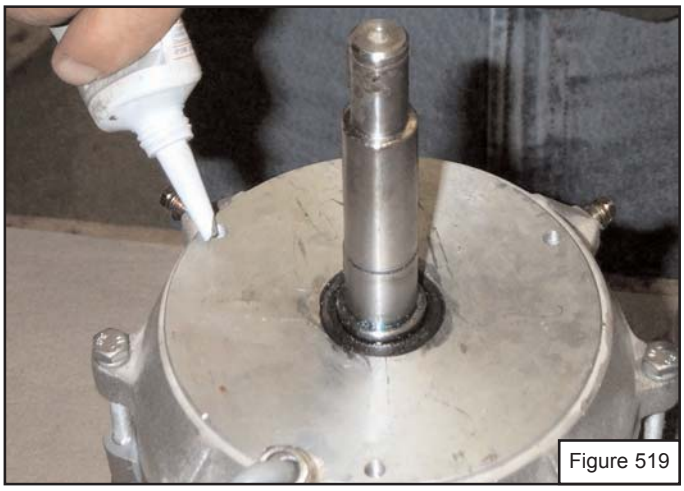


Figure 519

5.5 Disc Inspection

The thickness of a new brake disc depends on the size of the brake. The brake size is marked on the top of the brake coil. If excessive brake wear is apparent or the air gap is significantly greater than 0.012" (0.3mm), measure the brake disc with a caliper. See Figure 520.

Model	Brake Size	New Disc Thickness
XE 501PA1	FDB 13 (#47446)	8 mm

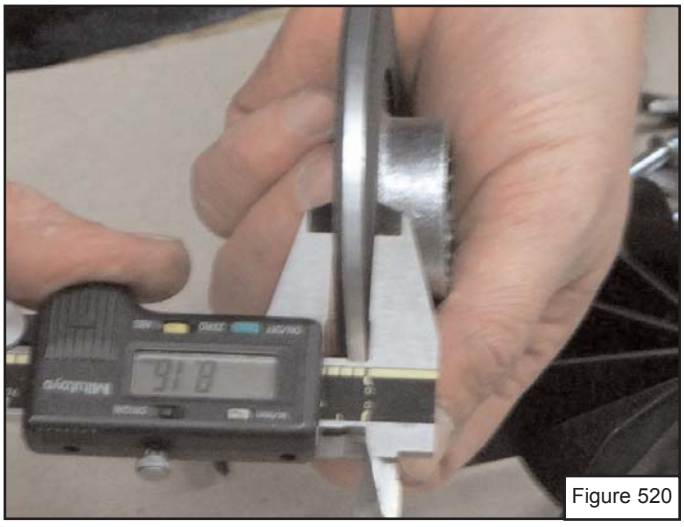


Figure 520

Maximum brake wear is 0.040" [1mm] - If disc thickness is less than 7 mm, the brake disc must be replaced.

5.6 Brake Air Gap Adjustment

If adjustment is required proceed as follows.

The air gap (a) should be 0.012" [0.3mm]. If necessary, adjust by means of the three set screws (A) and counter nuts as follows:

1) Loosen the three socket head fixing screws a few turns as shown in Figure 521.

Figure 521

2) Adjust each of the three 10mm adjustment screws (Figure 522) AN EQUAL # OF DEGREES to either increase or decrease the air gap (a) to 0.012" [0.3mm]. Unbalanced adjustments will lead to improper brake wear.

Figure 522

3) Tighten down the three socket head fixing screws w/locking washers.

4) Measure the air gap as shown in Figure 523. If necessary, repeat steps 1-3 until an air gap of 0.012" (0.3mm) is achieved.

Figure 523

5) Remove each of the three socket head fixing screws separately and apply a bead of silicone (Figure 524) to the tip to prevent water entry into the motor. Replace all three screws.

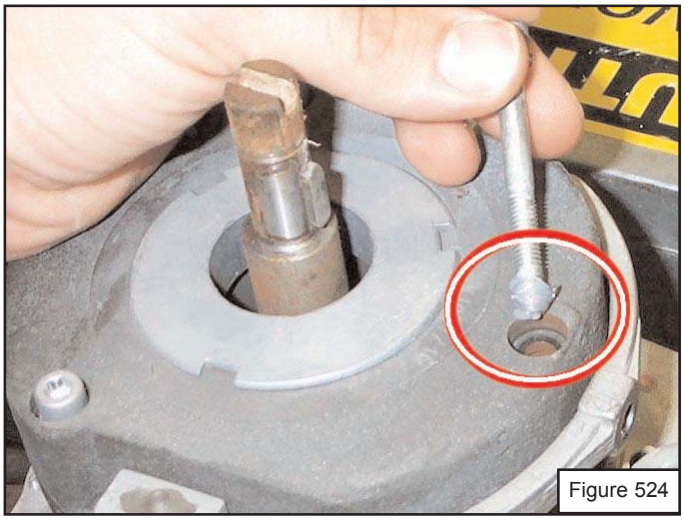


Figure 524

NOTE:
The adjustment of the gap on the brake release stirrup has NOTHING TO DO with the adjustment of the air gap of the brake!

5.7 Release Strirrup Replacement

1) Carefully remove all sealant (Figure 525) if the brake release stirrup is to be replaced.

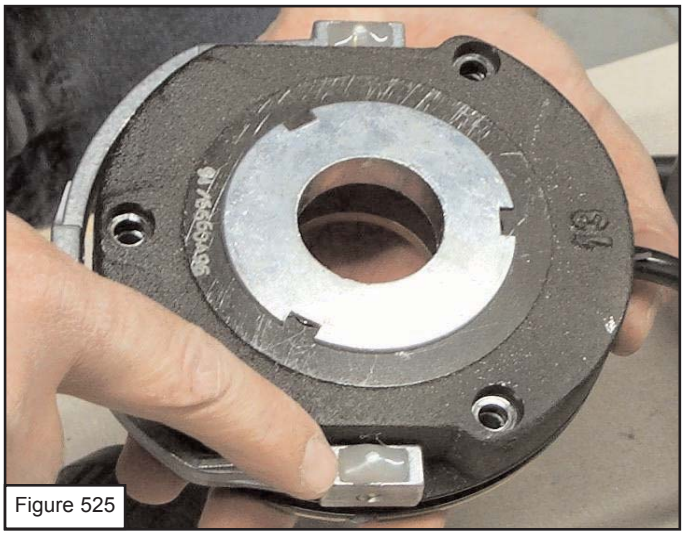


Figure 525

2) Use a C-clamp to hold the brake assembly together as shown in Figure 526.

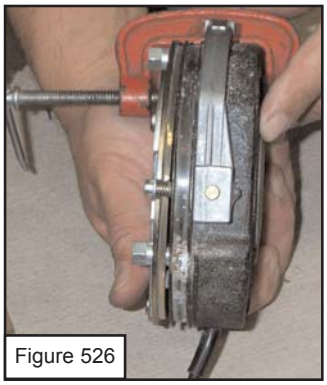


Figure 526

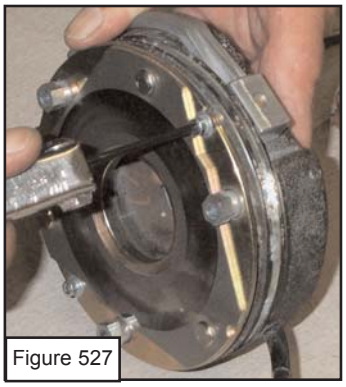


Figure 527

3) Unscrew the two fixing screws (E) (Figure 527)

4) Install the new brake release stirrup (B) {#61726}.

5) Install the new fixing screws (Figure 528).

6) Install the brake onto the motor. Apply silicone to the brake end shield holes prior to installation to prevent water from entering the motor. Replace all three screws.

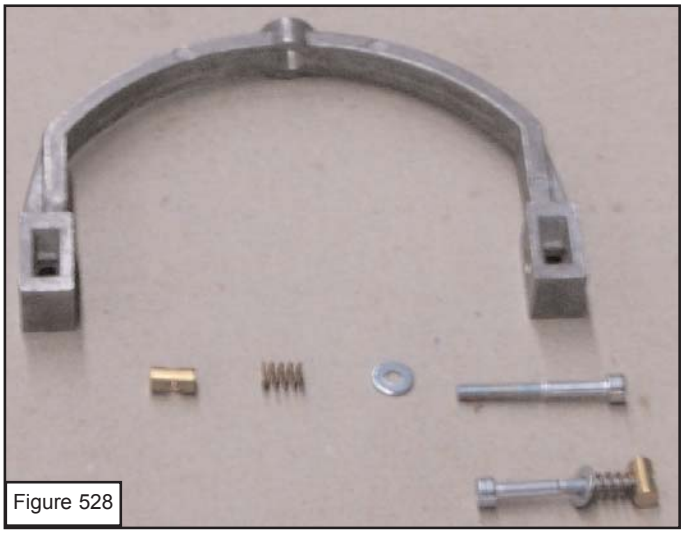


Figure 528

7) Measure distance (b) between the brake retraction plate (C) and washer (D) in Figure 529. This distance must be 0.040" (1mm). If necessary, adjust symmetrically on both sides by means of the two screws (E).

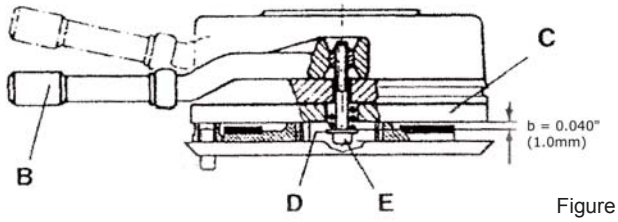


Figure 529

5.8 Operational Check

Testing must be carried out once the brake has been completely reassembled. With the fan cover removed, proceed with the operational check:

1) With the correct power supplied to the hoist, push the up or down button.

2) Visually inspect that the anchor disc (C) lifts evenly upward away from the brake disc. A pronounced "click" or "snap" should be heard when it retracts magnetically.

3) CAREFULLY feel for heat (Figure 530 on the next page) around the entire electromagnetic brake being cautious around the rotating fan.

Figure 530

Figure 531

4) If there is any heat being generated, re-inspect the brake air gap because the disc is most likely dragging.

5) If no heat is generated, reinstall the fan cover. When installing the fan cover, pull back as shown in Figure 531 to gain more clearance for the emergency descent lever.

5.9 Brake Coil Resistance Inspection

Measure the resistance of the brake coil as shown in chapter 7, “Control Box”.

The XE501PA1 should have a brake resistance of approximately 270 ohms.

Brake coil resistance is also found on the wiring diagram.

WARNING

Upon completion of any brake maintenance, it is MANDATORY that a load test of the hoist be completed.

5-10 Primary Brake Parts List

Brake Type	Code Complete	Disc Code	Release Code	Hub Code
Precima Model FDB13 Resistance 270 ohms	49756	47446	61726	47456
Lenze Model Gr. 10/96V	18066	17466	17476	17496

Table 501

5-11 Assembly and Adjusting

Fix the new brake to the motor and connect it into the control box.

Check the air gap (a) = 0.012” [0.3mm] around the brake with a feeler gauge - if necessary, adjust by means of set screws (A) (See Section 5.3).

When assembling a new brake check adjustment of brake release lever (B) (See Section 5.7).

With the brake closed the distance (b) between anchor disk (C) and washers (D) must be 0.028” [0.7mm]. If necessary, adjust symmetrically on both sides by means of screws (E).

WARNING

The adjustment of the brake release lever must not be changed afterwards, even in case of an air gap (a) readjustment, as security is adversely affected.

6) MOTOR

6-1 Replacement of Motor Winding (Stator)

NOTE:
The motor and control box must be removed before attempting to replace the motor winding (stator).

1) Remove the fan cover 4x8 mm hex screws as shown in Figure 601.

Figure 601

2) Remove the fan snap ring {#3866} shown in Figure 602.

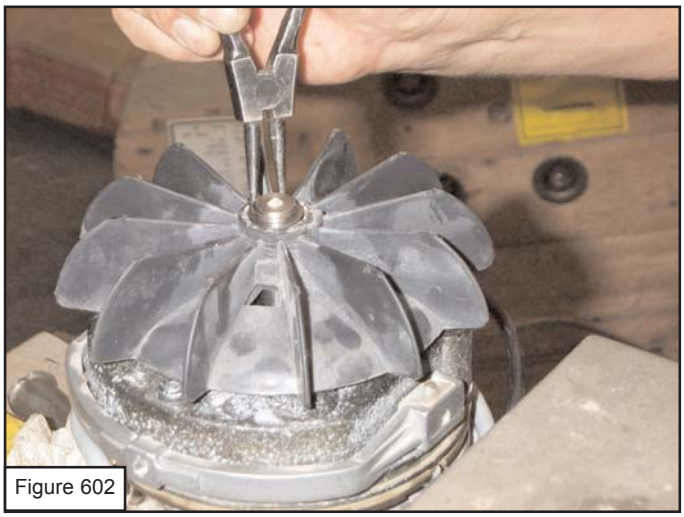


Figure 602

3) Remove the fan {#16186} with two screwdrivers placed under the fan and against the motor shaft and pry upward (Figure 603).

Figure 603

4) Remove the whole brake assembly by removing the three socket head fixing screws w/locking washers. (Figure 604).

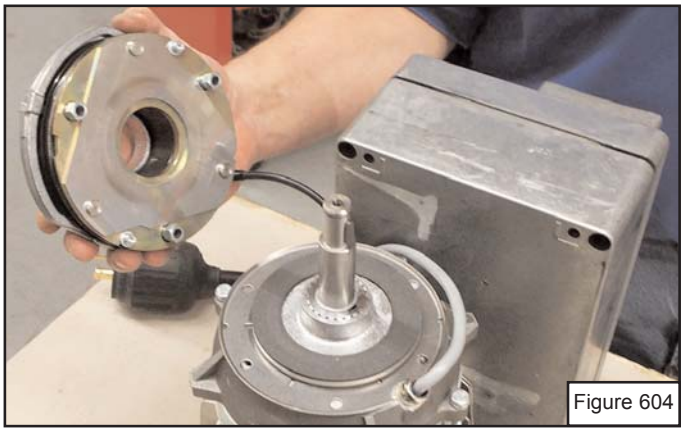


Figure 604

5) Remove the brake disc {#47446} and the brake hub {#47456}. Remove the snap ring {#536} and carefully pry the hub from the motor shaft as shown in Figure 605.

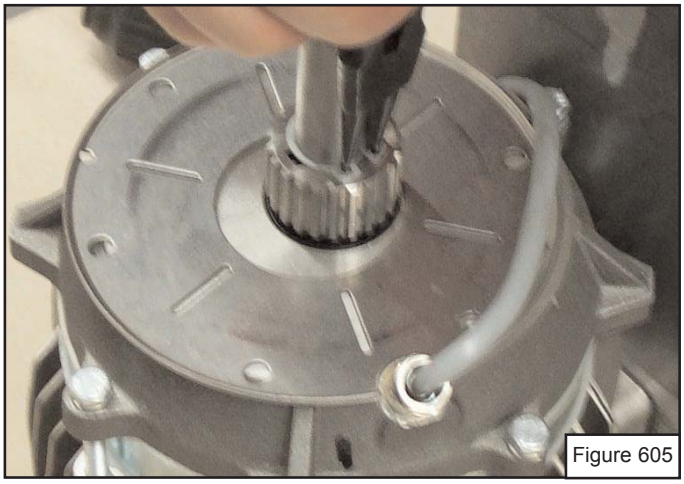


Figure 605

6) Remove the friction plate {#35816} shown in Figure 606.

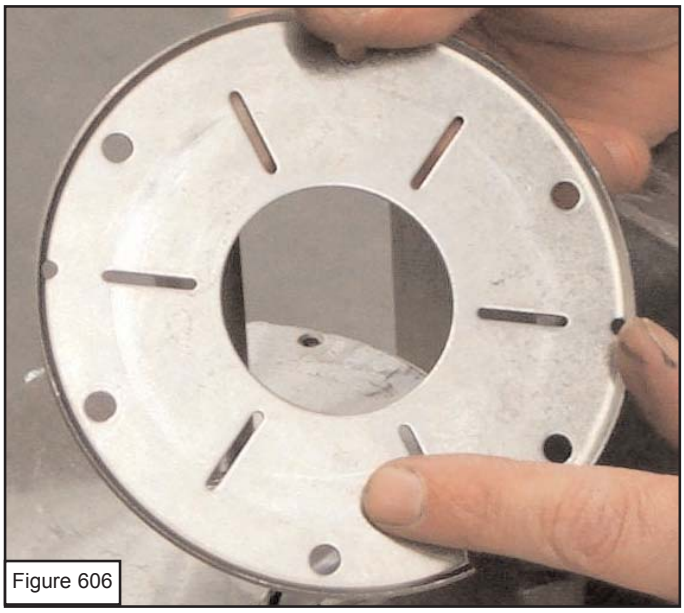


Figure 606

7) Remove the 4x10 mm hex head screws holding onto brake flange shown in Figure 607.

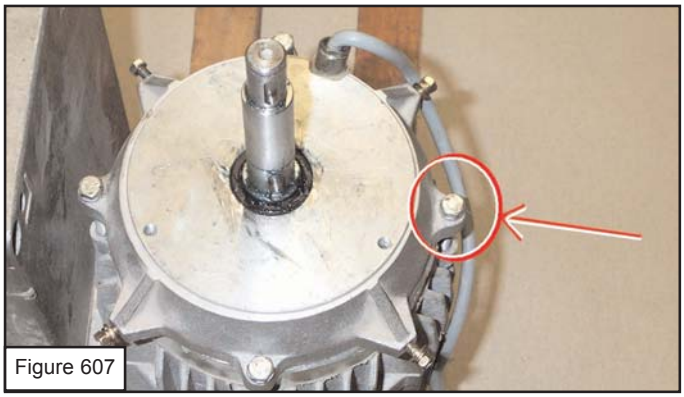


Figure 607

NOTE:
Prior to removal, pay attention to the brake orientation and mark it for realignment (Figure 608).

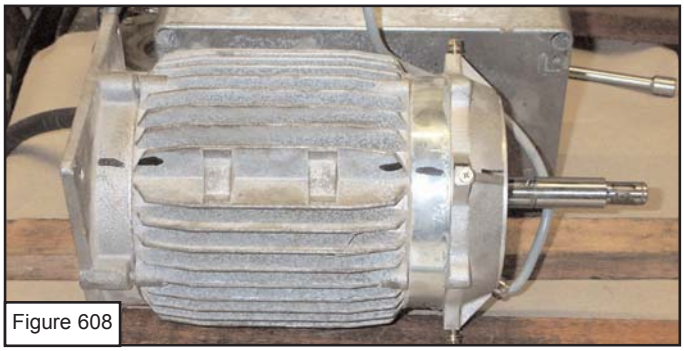


Figure 608

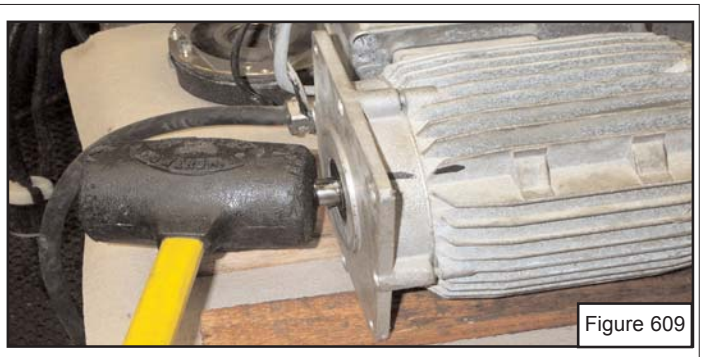


Figure 609

8) Using a rubber mallet, drive out the motor shaft as shown in Figures 609 and 610.

Figure 610

9) Remove the four socket head fixing screws holding the lower motor flange to the stator shown in Figure 611.

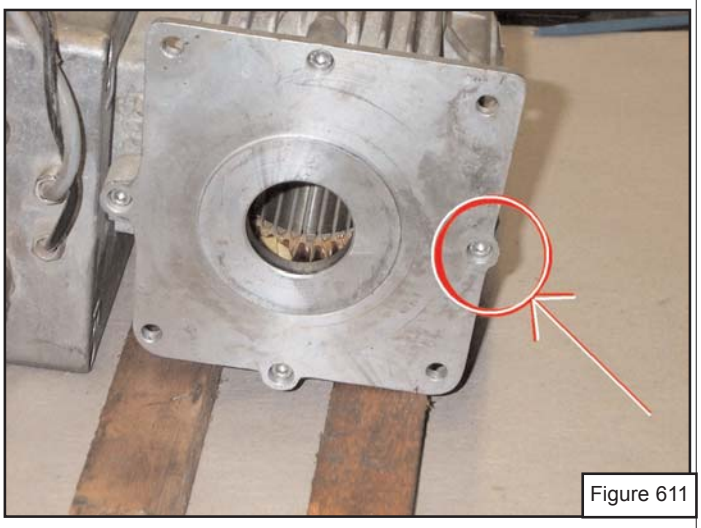


Figure 611

10) Use a rubber mallet to remove the flange from the stator (Figure 612).

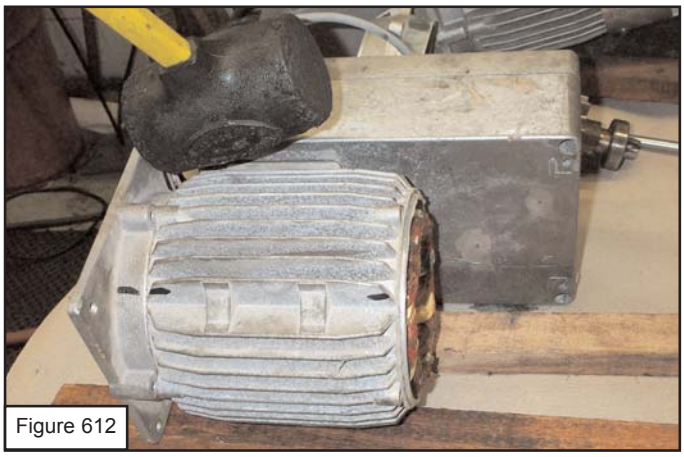


Figure 612

11) Remove the yellow and black winding wires from Pos. 13 (Figure 613).

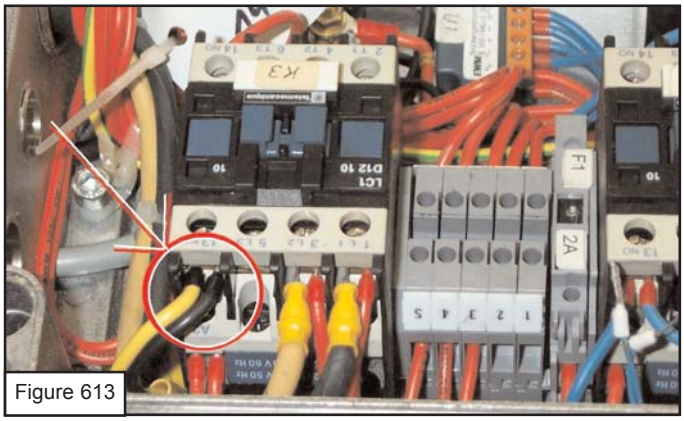


Figure 613

12) Remove the ring terminal winding wires (black-w, red-z, red-u and black-v) as shown in Figure 614.

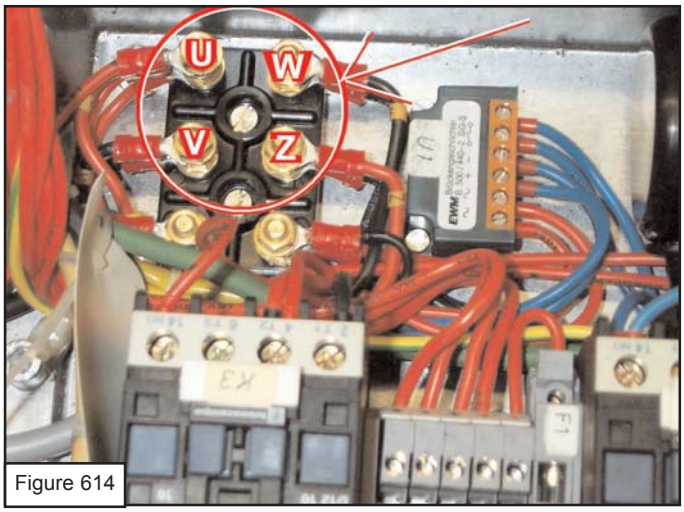


Figure 614

13) Remove the small thermal protector wires from grey X1 and X2 (Figure 615).

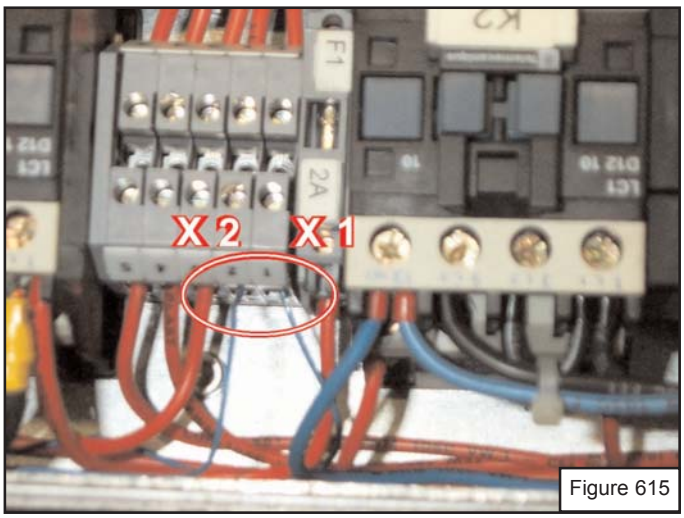


Figure 615

14) Remove the four socket head cap screws and lock washers that are holding the control box to the motor. Remove the control box (Figure 616).

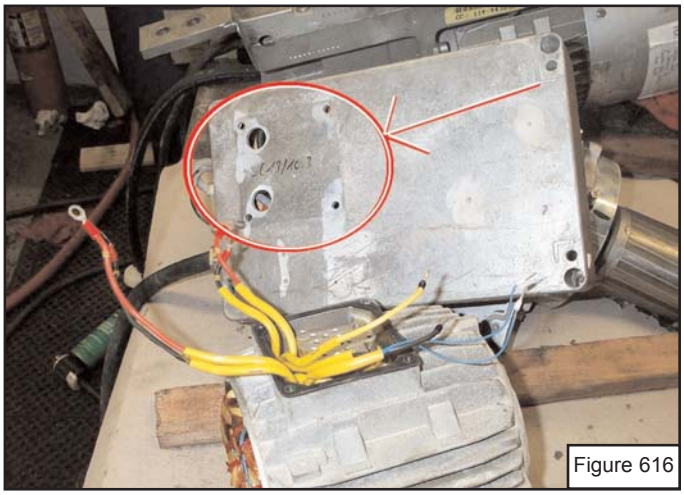


Figure 616

15) Replace the old wire winding with a new wire winding as shown in Figure 617.

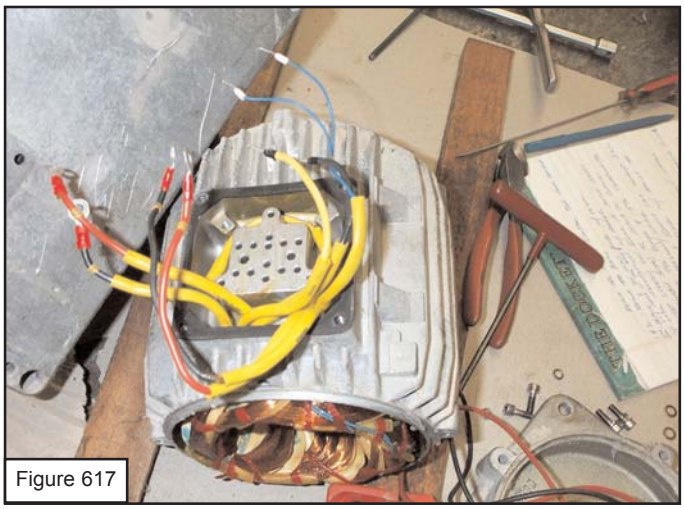


Figure 617

16) Ensure that the blue and yellow winding wires remain under the control box (crimped or soldered together and insulated) as shown in Figures 618 and 619.

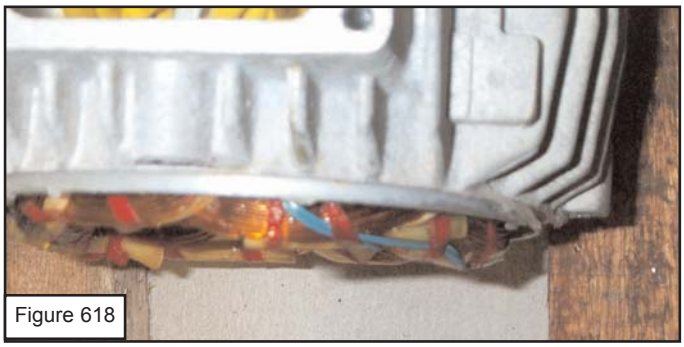


Figure 618

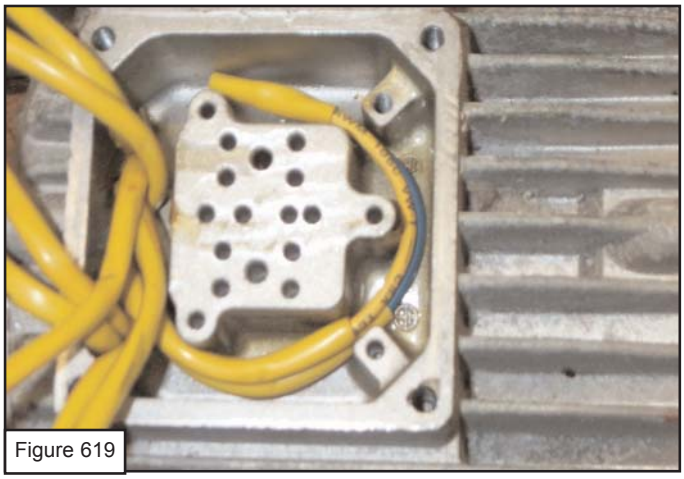


Figure 619

NOTE:
Reassembly procedure is the reverse of the disassembly procedure.

6-2 Centrifugal Switch Replacement XE501PA1

1) Remove the motor and control box from the hoist (See Figure 620). Remove the fan cover 4x8mm hex head screws (Code #16086, Pos. 27).

Figure 620

2) Remove the fan snap ring (Code # 3866, Pos. 21, Figure 621) and pry off the fan (Code # 16186, Pos. 5) using 2 screwdrivers (See Figure 622). Make sure the screwdrivers are against the motor shaft when prying.

Figure 621

Figure 622

3) Take off the primary brake (Code #47406, Pos. 33) by removing the 3 socket head cap screws (See Figure 623).

Figure 623

4) Remove the brake disc, friction disc, snap ring, hub and key (See Figure 624).

Figure 624

5) Remove the 4 M5X25 hex screws (Code #5886, Pos. 26) that hold the cast aluminum brake end bell housing to the motor (See Figure 625).

Figure 625

6) Mark the position of the white centrifugal switch for easy alignment during reassembly (See Figure 626).

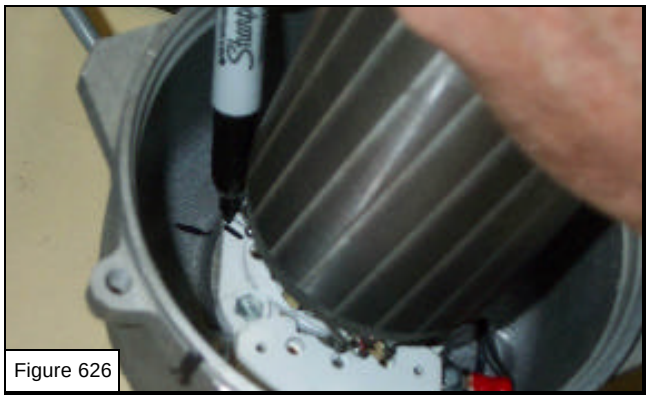


Figure 626

7) Loosen the 2 screws holding the centrifugal switch wires and remove the 2 spade connectors from beneath the screws (See Figures 627 and 628).

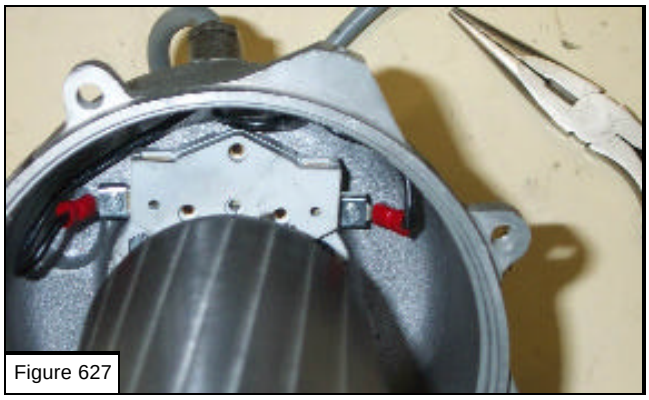


Figure 627

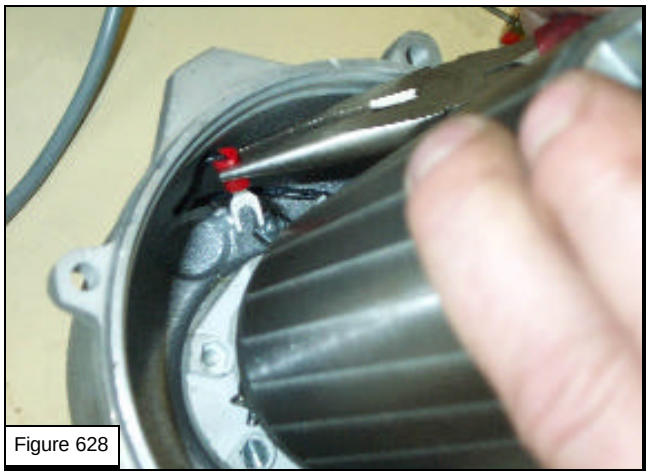


Figure 628

8) Unscrew the 3 M4x16 screws (Code #16, Pos.28) holding thecentrifugal switch (See Figure 629).

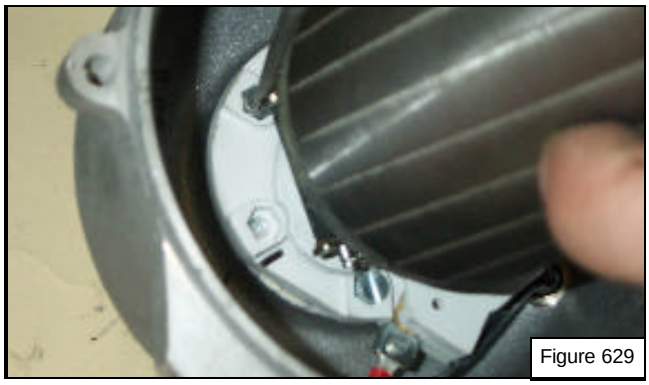


Figure 629

9) Mark the flange for reassembly (See Figure 630).

Figure 630

10) With a rubber mallet, tap the cast aluminum brake end bell (Code #63257, Pos. 4,Figure 631).

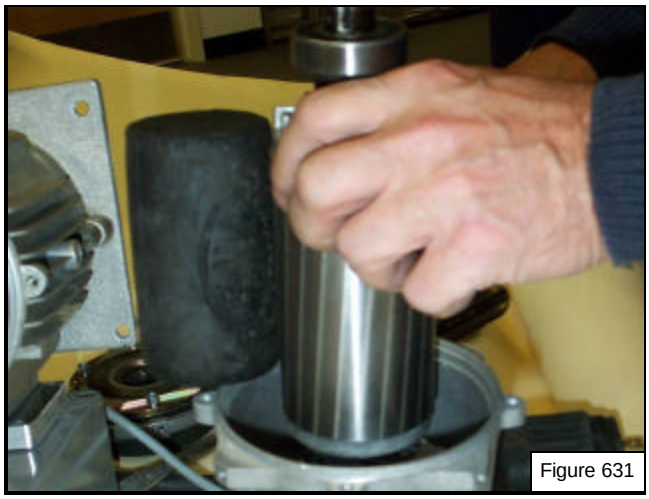


Figure 631

11) Remove the shaft assembly (Figure 632).

Figure 632

12) Loosen the set of screws holding the mechanical part of the centrifugal switch (See Figure 633) and push the assembly away from the ball bearing to allow room for a puller (See Figure Figure 634).

Figure 633

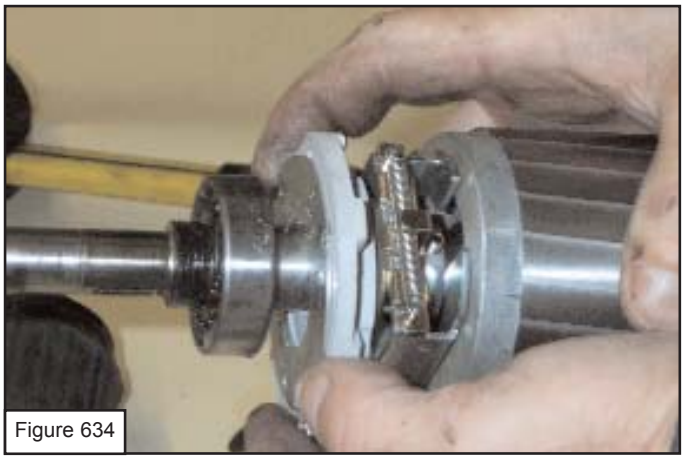


Figure 634

13) Remove the ball bearing 6004-RS1 (Code #16536, Pos. 18) by removing the snap ring (Code #, Pos , Figure 635) and pulling with a bearing puller (See Figures 636 and 637).

Figure 635

Figure 636

Figure 637

14) Remove the bearing. Note that one side is sealed and the other side is not (See Figure 638).

Figure 638

15) Remove the snap ring (Code #536, Pos. 20) in Figure 639.

Figure 639

16) Remove the bearing cover (Code #50348, Pos.) in Figure 640.

Figure 640

17) Remove the white centrifugal switch and mechanical actuating mechanism (See Figure 641 and 642).

Figure 641

Figure 642

NOTE
We suggest you layout the parts on the workbench for ease of reassembly (See Figure 643).

Figure 643

18) Check the centrifugal switch contacts for burn, malfunction, etc. Manipulate the switch to see if the contacts open and close (See Figure 644).

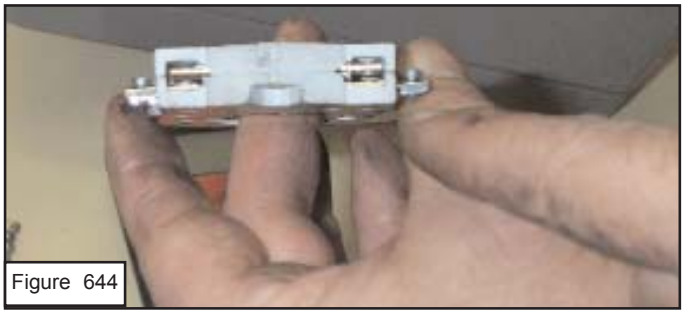


Figure 644

NOTE
Sometimes contact cleaner and emery cloth can repair a malfunctioning switch (See Figure 645).

Figure 645

19) Before installation of a new switch, check that it functions properly with a meter. Open and close the switch. The meter should indicate open (Figure 646) and closed (Figure 647) when manipulated on the bench.

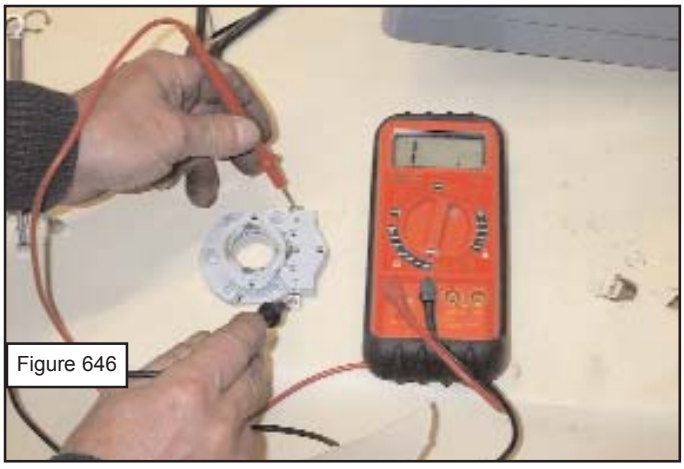


Figure 646

Figure 647

If it stays open, clean the contacts with contact cleaner and emery cloth (See Figure 648 and 649).

Figure 648

Figure 649

NOTE
If the switch remains open after cleaning, it is recommended that the old switch be replaced with a new switch.

20) Reassemble the new mechanical and electrical switch on the motor shaft (See Figure 650).

Figure 650

21) Replace the bearing cover (Code #50345, Pos. 7, Figure 640) and reaffix the snap ring (Code #536, Pos. 20, Figure 639). Repack the ball bearing with grease. Note that the seal is on the bottom and the bearing is open to the top (See Figure 651).

Figure 651

22) With a metal tube (Figure 652) tap the bearing onto the shaft until it contacts the snap ring below it (See Figure 653).

Figure 652

Figure 653

23) Replace the snap ring (Code #536, Pos 20) on the shaft (See Figure 635).

24) Squeeze the mechanical portion of the centrifugal switch while sliding it up the shaft (See Figure 654). With the set screw lock it into position on the shaft (See Figure 633).

25) Manipulate the new switch to see if it opens and closes properly (See Figure 654).

Figure 654

26) Reattach the wires to the switch (Figure 655).

Figure 655

27) Check the winding for burns or damage (See Figure 656).

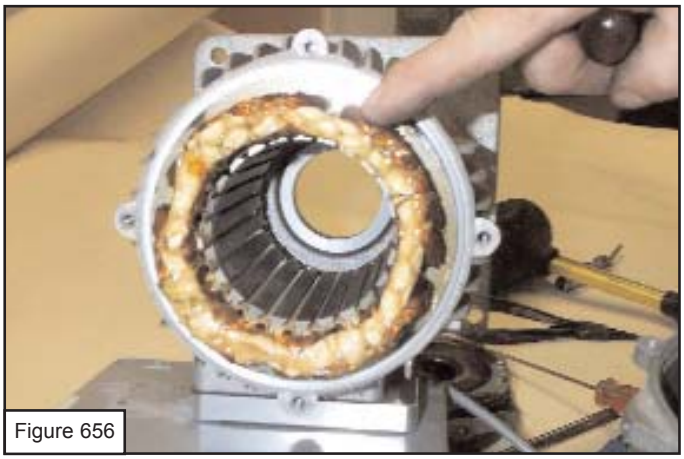


Figure 656

28) Put the cast aluminum brake end shield on the motor shaft (See Figure 657).

Figure 657

29) Realign the switch and retighten the 3 M4x8 screws (Code #16, Pos. 28, Figure 629). Place silicone around the bottom of the cast aluminum end shield to seal the joint between the winding and shield.

30) Place the motor shaft assembly into the winding, align the marks and tighten the 4 M5x25 (Code #5886, Pos. 26) screws.

31) Reassemble the brake per Section 5-12.

32) Replace the fan cover.

33) Refit the motor (See Chapter 6).

NOTE
Centrifugal switch replacement is now complete. Load test the hoist prior to returning it into service.

6-3 Motor Parts List XE501PA1 (Page 1 of 2)

Spare Parts	Drawing	22521	MOTOR UCE 90L/10-4F		N°	E-3031
	List	22522			Edition	2
	State	02.06.97	200V / 60 Hz Single Phase	for XE501PA1	Date	4/18/03

Pos.	Code #	Qty.	Designation	Specification
–	17198	1	Motor complete without control	–
1	12427	1	stator	–
4	45225	1	flange end shield	for C 90
5	14507	1	brake end shield	–
6	26625	1	distance ring	–
7	26635	1	bearing cover	–
8	16186	1	fan	V80/15
9	36397	1	fan cover compl	–
(11*)	16206	1	motor name plate	–
(12*)	16706	1	brake name plate	–
15	23516	1	centrifugal switch	–
17	28287	1	motor shaft with rotor	–
18	27586	1	bearing 6204-2RS1	20/47/14 DIN 625
19	16546	1	bearing 6205-RS1	25/52/15 DIN 625
20	26446	1	shaft seal	25/35/7 BASL DIN 3760
21	9996	2	snap ring	25x1,2 DIN 471
22	536	1	snap ring	20x1,2 DIN 471
23	3866	1	snap ring	A15x1 DIN 471
24	43056	1	key	B6x6x25 DIN 6885A
25	16586	1	key	A6x6x16 DIN 6885
26	16256	1	key	A5x5x16 DIN 6885
27	28796	4	hexagonal screw	M6x50 DIN 933
28	7746	4	socket head cap screw	M6x35 DIN 912
29	16086	4	hexagonal screw	M6x10 DIN 933
30	33136	3	cheese head screw	M4x16 DIN 84
32	16616	4	spring washer	A6 DIN 127
33	16246	4	spring washer	A5 DIN 127
(34*)	16236	2	grooved drive stud	2x6 DIN 1476
(35*)	3776	2	blind riveting	2,4x6 mm
40	49756	1	brake complete	FDB 13/96 V * does not include pos. 41
41	35816	1	friction plate	FDB 13
42	42486	1	brake coil assy.	FDB 13/96 V
43	47446	1	brake disk	FDB 13
44	47456	1	hub	FDB 13
45	61726	1	release stirrup complete	FDB 13

*) not shown

6-3 Motor Parts List XE501PA1 (Page 2 of 2)

Spare Parts	Drawing	22521	MOTOR UCE 90L/10-4F		N°	E-3031
	List	22522			Edition	2
	State	02.06.97	200V / 60 Hz Single Phase	for XE501PA1	Date	4/18/03

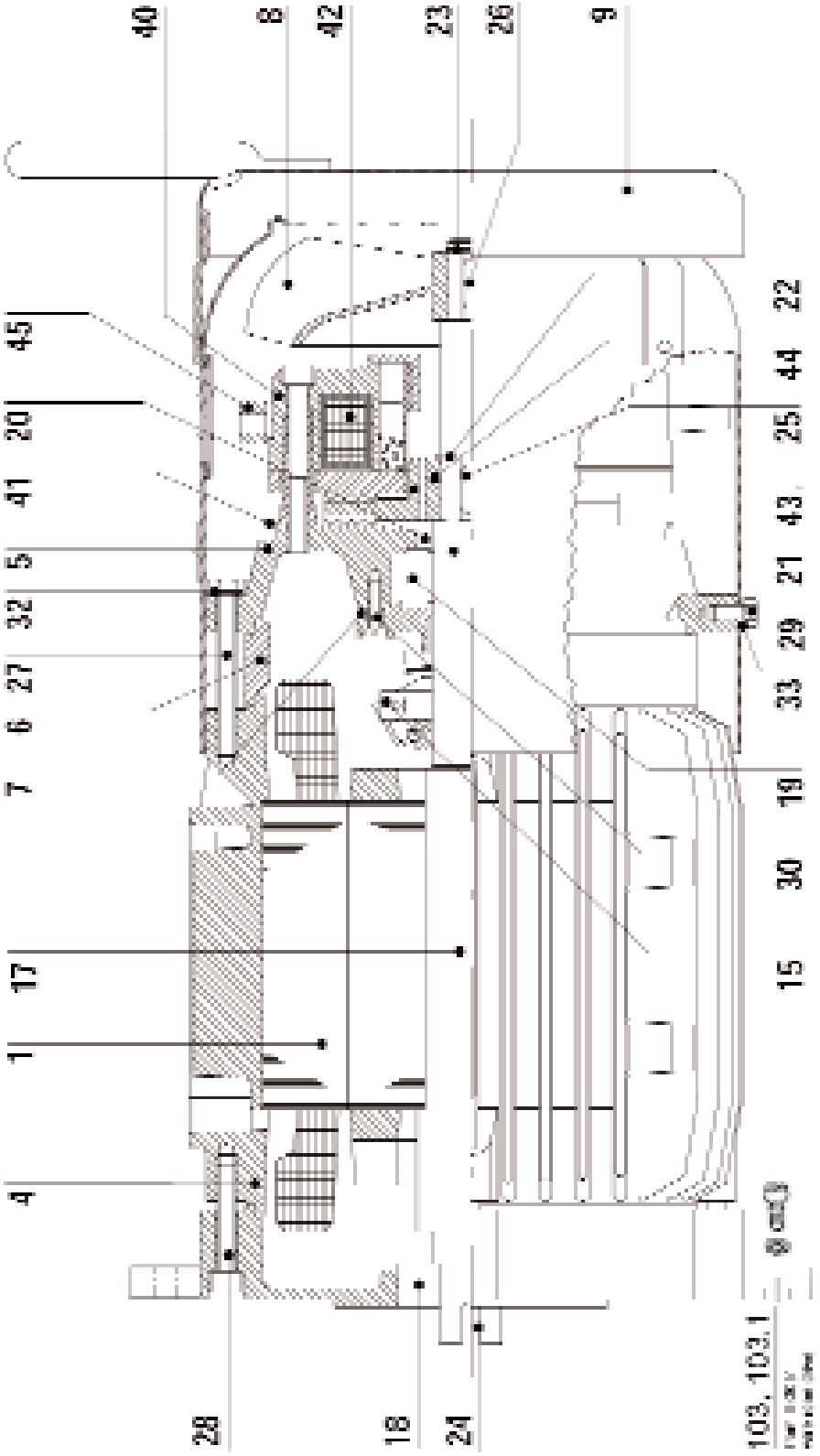


Figure 620

7) CONTROL BOX XE501PA1

NOTE:
All of the following checks are done without power to the motor or hoist.

7-1 Tools Required (Figure 701)

- 5mm allen wrench
- Volt/Ohm meter
- Digital capacitor meter (150uF readout)
- 2 insulated screwdrivers
- 8mm socket head nut driver
- Insulated needle nose pliers
- Thin straight blade screwdriver

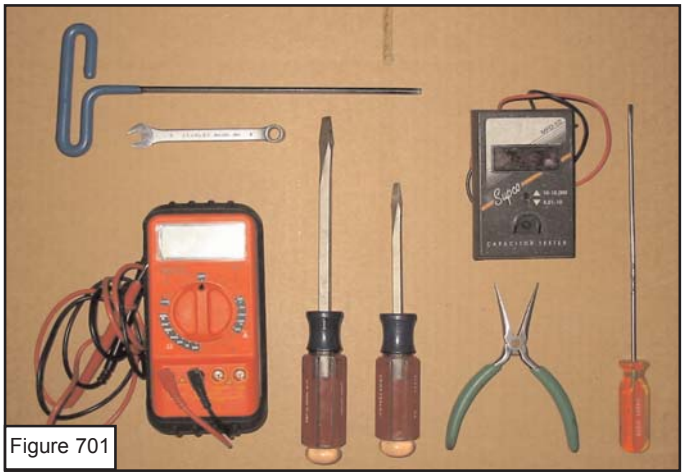


Figure 701

7-2 Control Box Cover Inspection

1) Check that all labels are legible and in the right place (Figure 702). If not, replace those labels. See page 64 for correct location and code.

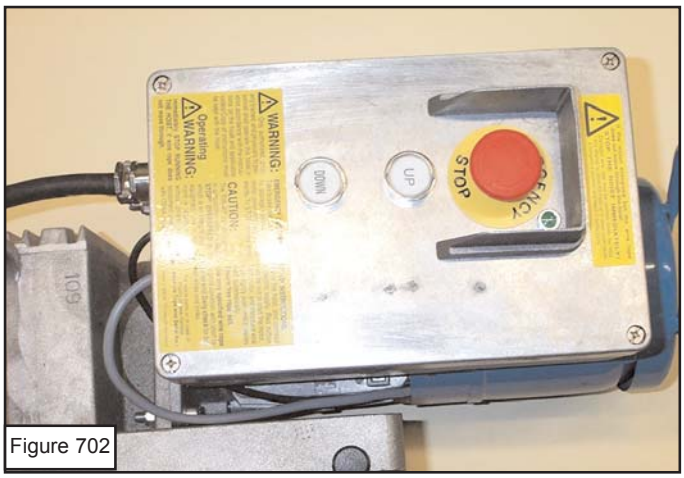


Figure 702

2) Check that the emergency stop button {#18296, Pos. 21} functions normally (Figure 703). Press it to lock in the "Off" position. Twist it to check that it springs open into the "On" position. Check that it is not loose. If it is, open the cover and tighten the two screws that hold it in place.

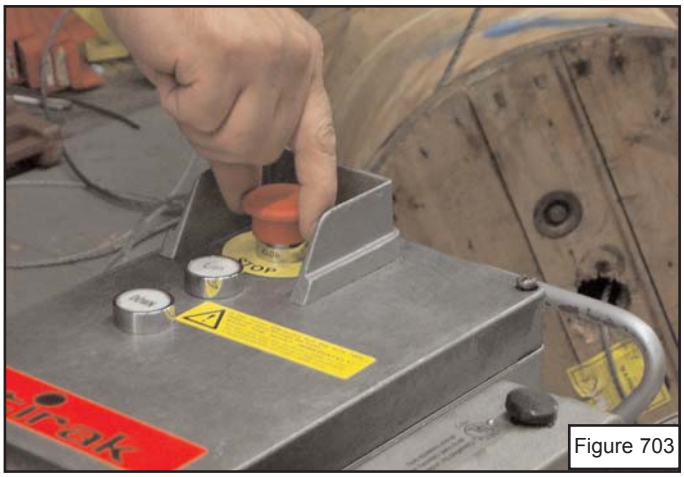


Figure 703

3) Check that the protective cover {#35435, Pos. 3} around the emergency stop button is in good condition and is not loose (Figure 704). Replace it if necessary. The 3 screws must be tightened and must have silicone applied to seal against water entry.

Figure 704

7-3 Ground (Cord/Plug) Check

1) With an ohm meter, check each prong to the case of the tirak. The long ground prong should show continuity (Figure 705).

Figure 705

The two shorter prongs should not show continuity (Figure 706).

Figure 706

NOTE:
If either of the shorter prongs show continuity to ground, a short circuit has occurred and must be fixed. It is possible that the plug is wired incorrectly or the insulation is cut. Open the plug and investigate. Also check the cord grip.

7-4 Wiring Diagram and General Condition of the Control Box

1) Using a screwdriver, open the control box (Figure 707). Check for corrosion (evidence of water entry). Check that the capacitors have not leaked fluid.

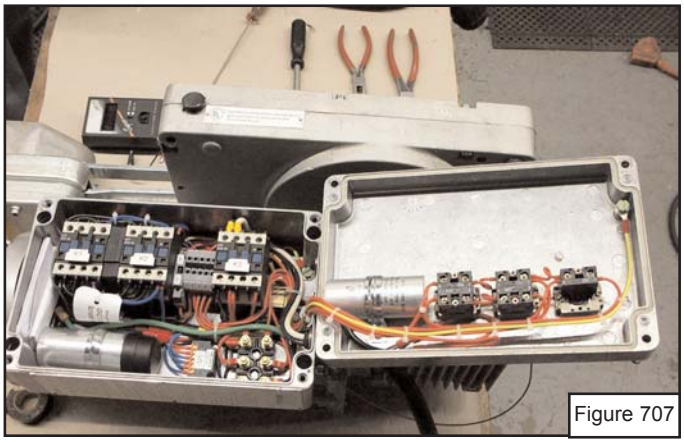


Figure 707

2) A tag tied to the control box indicates the control box type, GC13/10.3, and wiring dia gram, #14606 (Figure 708).

Figure 708

3) A full size diagram should be folded and tucked in place next to the relays. Check that the full size diagram matches the tag (Figure 709).

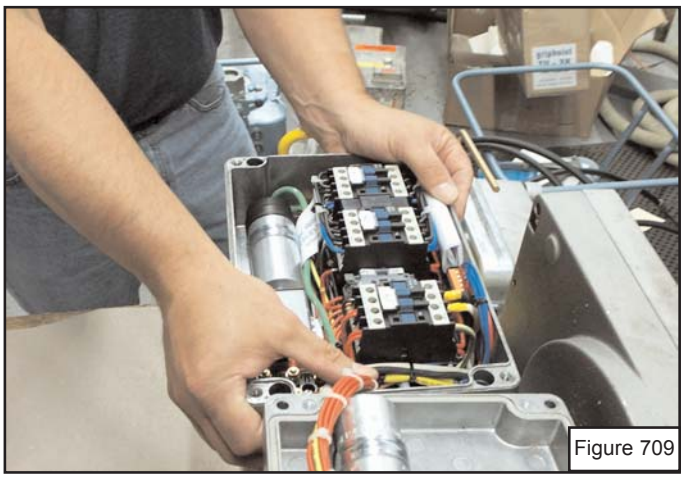


Figure 709

7-5 Stator/Winding Check

NOTE:
When using an ohm-meter, deduct the test probe resistance from any reading for accuracy. (Figure 710). Shown as 0.2 ohms.

Figure 710

1) With an ohm-meter, measure the resistance of the starting winding W/Z by placing test probes on Position 1(W) and Position 2(Z) of terminal board M1. 4.0 ohms is normal. (Figure 711, shows 3.8 ohms,OK). This is found on the wiring diagram #14606. If the connection is open, the stator must be replaced.

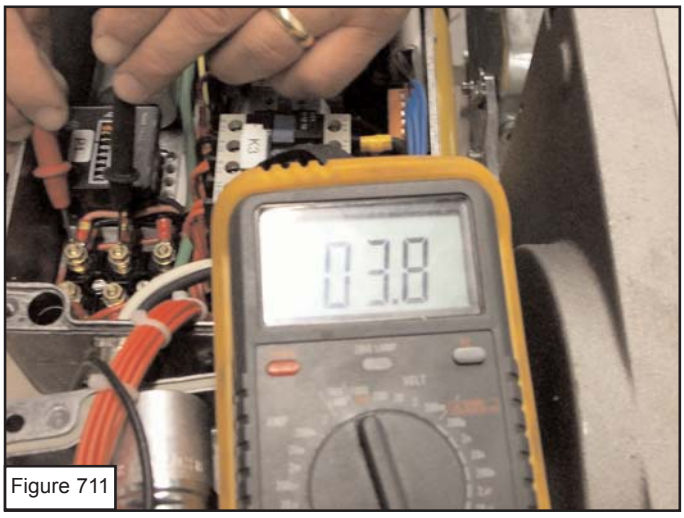


Figure 711

2) Check that the starting winding is not shorted to ground (Figure 712). There should be no continuity between W or Z and the control box casing (ground). If the connection is shorted, the stator must be replaced.

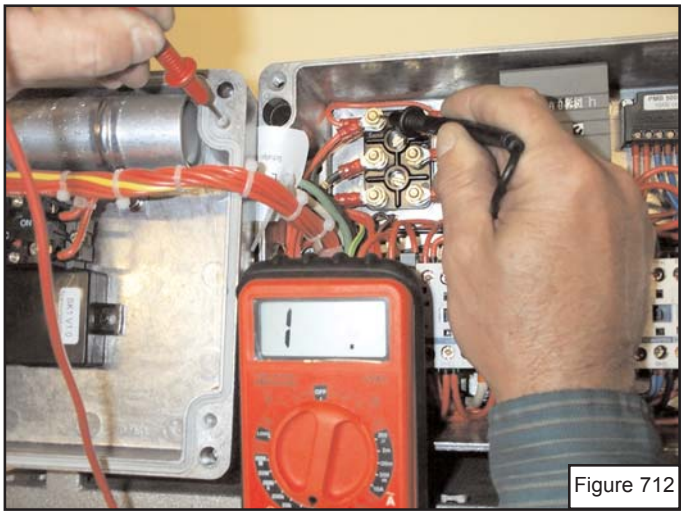


Figure 712

3) With an ohm-meter, measure resistance of the run winding U/V by placing the test probes on position 4(U) and position 5(V) of terminal board M1. 2.0 ohms is normal (Figure 713 on next page, shows 1.9 ohms). This is found on the wiring diagram #14606. If the connection is open, the stator must be replaced.

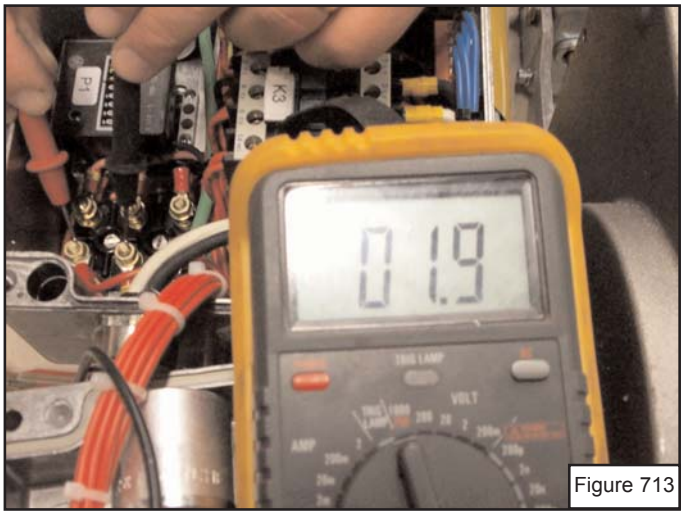


Figure 713

4) Check that the run winding is not shorted to ground (Figure 714 on next page). There should be no continuity between U or V and the control box casing (ground). If the connection is shorted, the stator must be replaced.

Figure 714

7-6 Fuse Check, F1 {#21076, Pos. 17}

1) With an ohmmeter, check continuity by placing the test probes on X1 and the opposite terminal of the fuse (Figure 715).

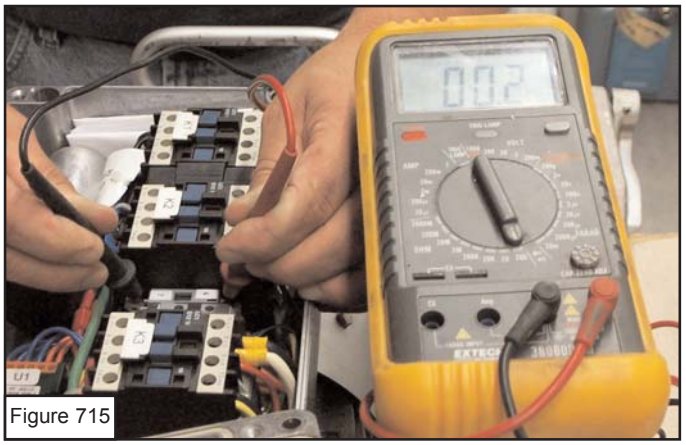


Figure 715

If no continuity is found, replace the fuse with the spare by lifting the grey fuse holder (Figure 716).

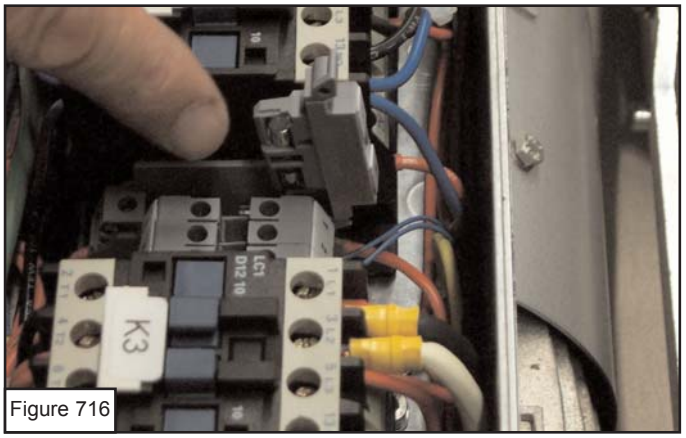


Figure 716

7-7 Thermal Protector Check

NOTE:
The thermal protector opens when the motor is hot in order to prevent damage. It is normally closed and automatically resets when the motor cools. If it activates, the cause must be found and fixed. It could be low voltage, a brake problem, overload, a winding problem, or a gearbox problem.

1) With the ohmmeter, place the test probes on X1 and X2 of the grey terminal board where the two small wires are fixed (Figure 717). If the connection is open, the stator must be replaced.

Figure 717

2) Check if the thermal protector is shorted to ground. Put the meter from X1 (or X2) and the case. It should be open (Figure 718). If continuity exists, the stator must be replaced.

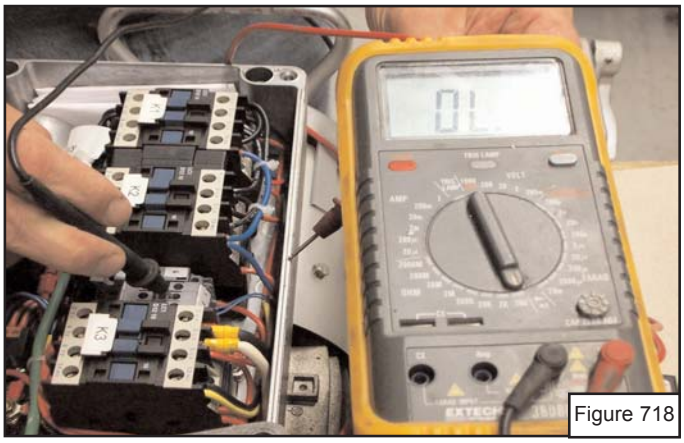


Figure 718

7-8 Relays

NOTE:
The 3 relays are marked K1, K2, and K3 (See Figure 719).

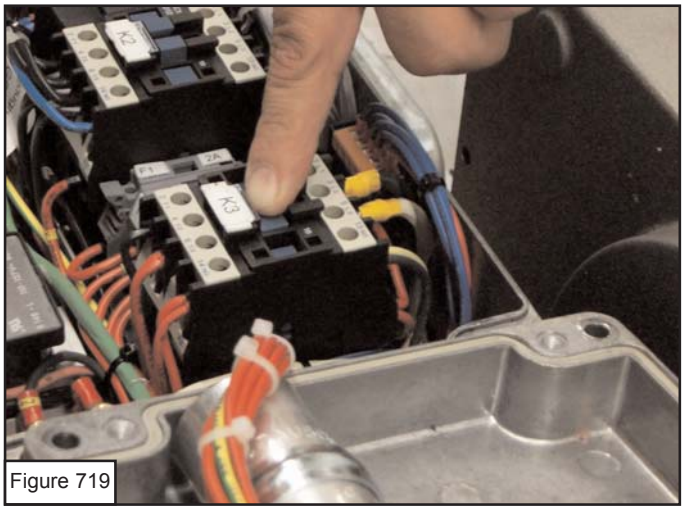


Figure 719

1) All 3 relays are the same except for the fact that K1 and K2 (UP and DOWN) have a mechanical interlock {#36766, Pos. 7} that allows only one relay to engage. Check the interlock by pressing K1 down (Figure 720). Now try pressing K2 down. The interlock should prevent K2 from downward movement. If it does not, the mechanical interlock must be replaced.

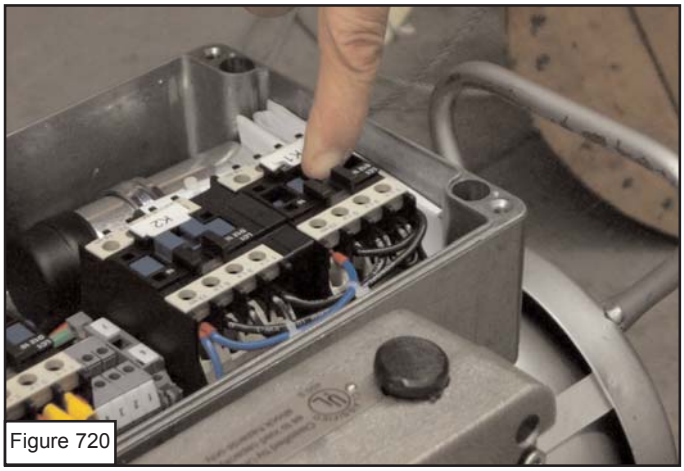


Figure 720

2) The main relay K3 coil resistance should be approximately 520 ohms. Place the ohmmeter test probes on the A1 and A2 screws of the K3 relay. Check the resistance (Figure 721, shows 528 ohms, OK). If the connnection is open or shorted, replace the K3 relay{#26226, Pos. 5}.

NOTE:
K1, K2, and K3 are all inspected in a similiar fashion.

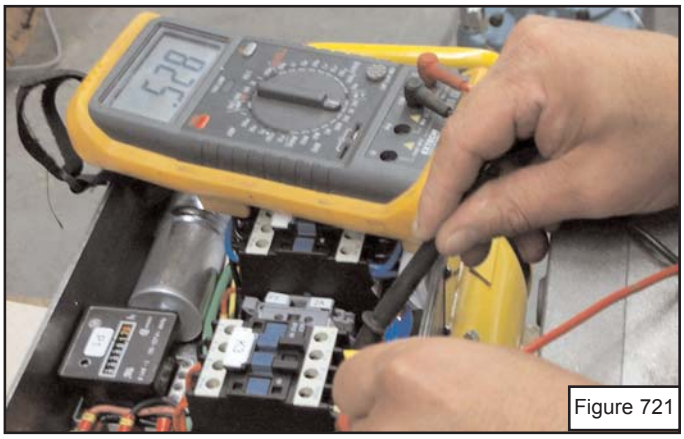


Figure 721

3) The DOWN relay, K2, coil resistance should also be approximately 520 ohms. Place the ohmeter test probes on the A1 and A2 screws of the K2 relay. Check the resistance (500 - 550 ohms is OK). If the connection is open or shorted, replace the DOWN relay {#26226, Pos. 5}.

4) The UP relay, K1, coil resistance should be approximately 520 ohms. Place the ohmmeter test probes on the A1 and A2 screws of the K1 relay. Check the resistance (500 - 550 ohms is OK). If the connection is open or shorted, replace the UP relay {#26226, Pos. 5}. If the relay contacts are OK, replace only the coil.

7-9 Brake Coil Resistance Check

With the ohmmeter test probes placed on the center two positive(+) and negative(-) terminals of the brake rectifier U1, measure the resistance (Figures 724 an 725, shows 272 ohms, OK). It should be approximately 270 ohms. If the connection is open or shorted, replace the brake coil .

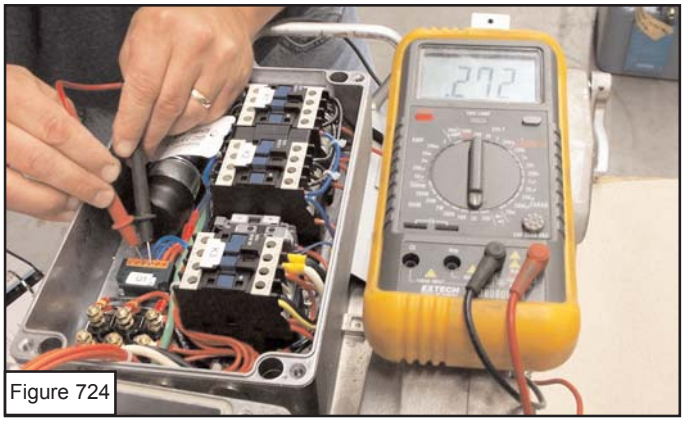


Figure 724

7-10 Capacitor Checks

1) Check the physical appearance of the 2 capacitors. Leakage of fluid or an expanded cap (Figure 726) indicates probably damage or malfunction.

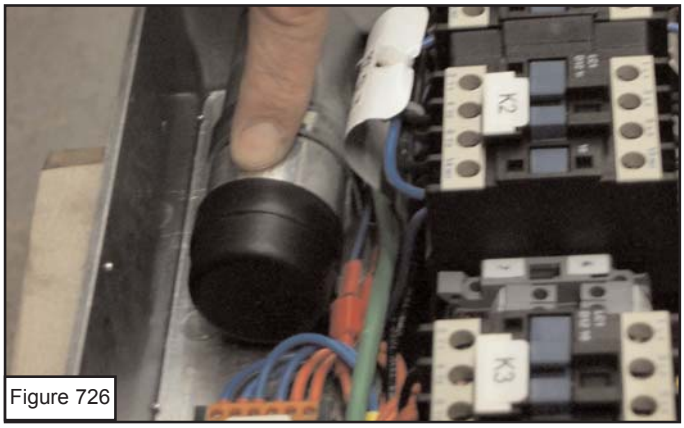


Figure 726

2) Discharge the capacitors by pushing down on the K2 and K3 relays for several seconds (Figure 727). This discharges the capacitors into the winding.

As an additional measure, you can short out capacitors and discharge the them by touching terminals 3(or 6) to 4 with insulated pliers (Figure 728). If a charge is stored, it

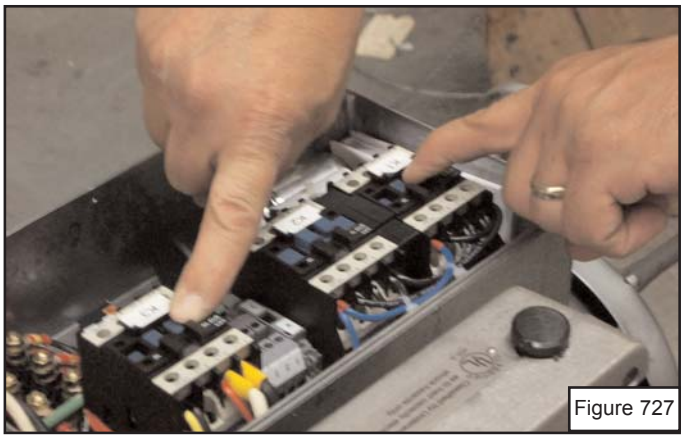


Figure 727

will flash, snap, and discharge. This can also be done by disconnecting the spade connections on the capacitor and shorting them with pliers (Figure 729).

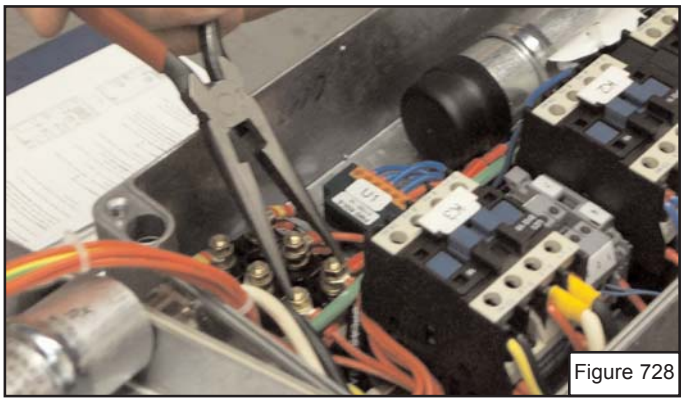


Figure 728

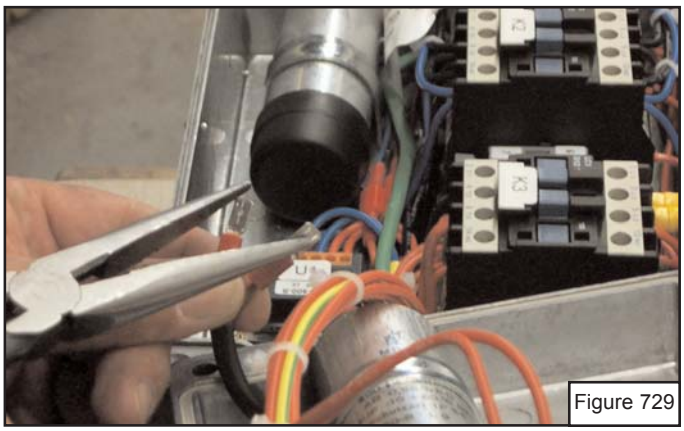


Figure 729

3) With a digital capacitor tester, measure the start and run capacitance by placing the test clips on position 4 and position 6 of the terminal board M1 (Figure 730, shows 156uf, OK). This should measure 145uF +/- 10% (the sum of the start capacitor CA(110uF) and run capacitor CB(35uF)). If the total is outside this range, check each capacitor as follows.

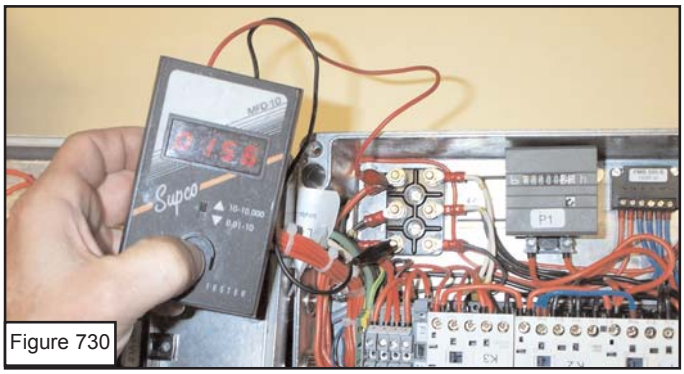


Figure 730

4) The start capacitor CA(110uF) is located on the cover of the control box. Detach the two insulated spade connectors. With the digital capacitor meter, measure the capacitance. It should be 110uF +/- 10% (100 to 121 uF). Figure 731 shows 114 uF, Ok. If the reading is outside this range, replace the start capacitor {#24906, Pos. 44}.

Figure 731

5) The run capacitor CB(35uF) is located in the control box and is larger in physical size than the start capacitor (Figure 732,). Detach the two insulated space connectors from the capacitor and attach the digital capacitor meter clips to the capacitor. Measure the capacitance. It should read 35uF +/- 10% (32 to 38uF). If the reading is outside this range, replace the run capacitor {#63456, Pos. 45}.

Figure 732

NOTE:
The capacitors are marked with their capacitance. Make sure the replacements are 35 or 110 uF only (Figures 733 and 734).

Figure 733

Figure 734

7-11 Centrifugal Switch Check

With an ohmmeter, place the the probes on position 5 and 6 of the terminal board M1 (Figure 735). The switch should be closed when the motor is not running. If it is open (Figure 736), it must be replaced (See Section 6.2 “Centrifugal Switch Replacement).

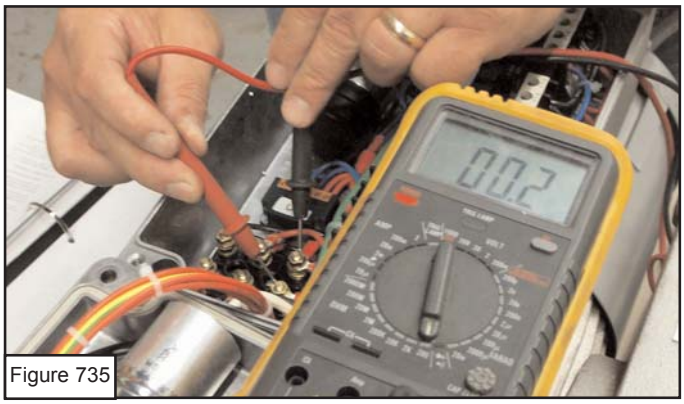


Figure 735

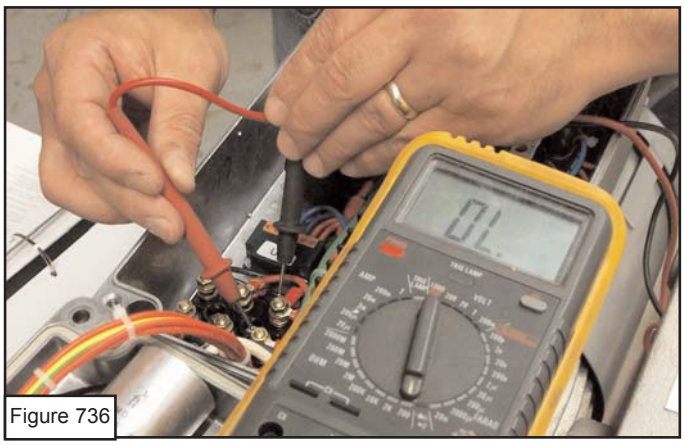


Figure 736

7-12 Pushbutton Checks

1) Contacts are marked NO = “Normally Open“ or NC = “Normally Closed”. Figure 737 shows continuity for a NC contact. If the button is pressed it should open. A NO switch operates in an opposite manner. Pressing the button closes the switch and creates continuity.

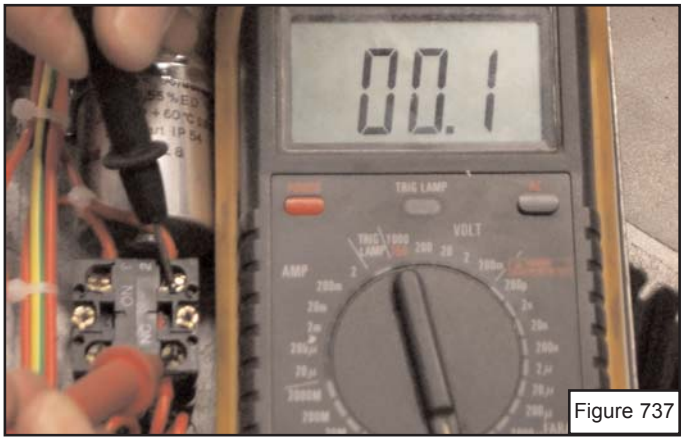


Figure 737

7-13 Control Box Base

1) Tighten the 4 socket head screws {#33156, Pos. 34} that hold the control box to the motor (Figure 738).

Figure 738

2) Check that the control box base is not distorted or cracked especially at the junction of the box to the motor. If damaged, it must be replaced.

7-14 Power Check

1) Open the emergency stop by twisting the red knob. It should spring open. This should cause the main relay, K3, to energize.

WARNING

The following checks are performed with power to the hoist motor. Whenever power is applied to the hoist, use extreme caution especially with the control box open as part are energized. Only trained and qualified personnel should service the hoist to avoid injury or death.

2) Measure the AC input voltage with a voltmeter at terminal 1 and 3 of the K3 relay (Figure 739). If no voltage occurs, check the fuse (Section 7-6) and bimetal protector.

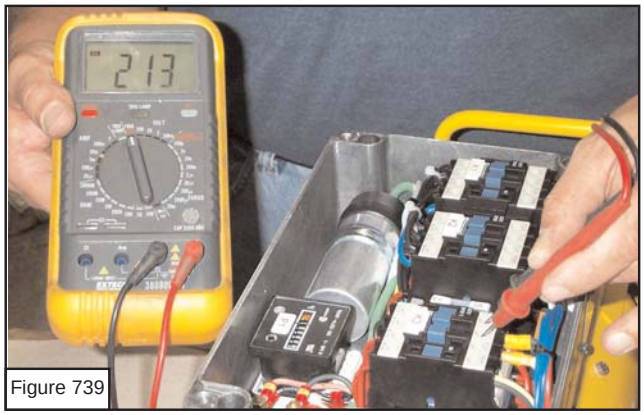


Figure 739

7-15 Brake Rectifier Check {#10917, Pos. 11}

1) Push either the up or down button on the control box cover. The motor should run.

2) While the motor is running, measure the AC voltage to the brake rectifier by placing the voltmeter probes on relay K3, Pos. 14 and 4 (refer to the wiring diagram in Chapter 8) or measure on the ~~ AC terminals of the rectifier U1. See Figure 740 and 741 (on the next page) which shows 105 volts AC to rectifier, OK

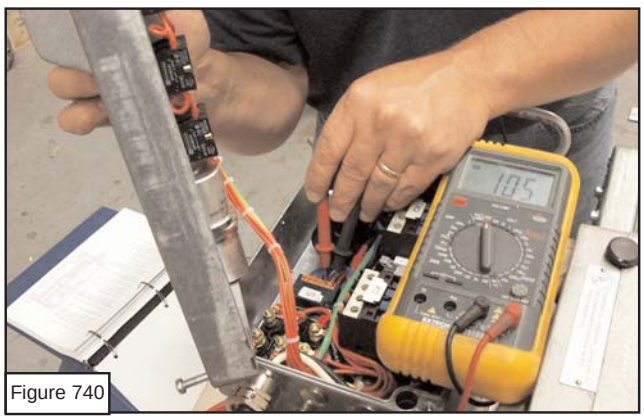


Figure 740

3) The AC voltage to the rectifier should be approximately 110 volts (Figure 740).

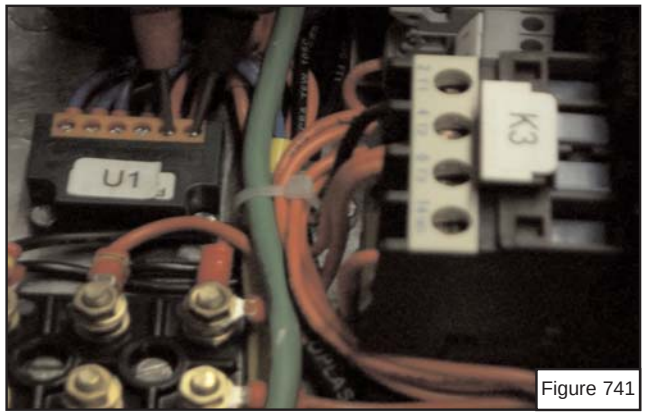


Figure 741

4) Measure the DC voltage from the rectifier. Change the voltmeter to DC. Measure the voltage output from the rectifier at the positive(+) and negative(-) screw terminals (2 center screws) while pressing the UP or DOWN button on the control box cover (Figure 742 and 743, which shows 91 DC volts from the rectifier, OK). It should read approximately 96 volts. If not approximately 96 volts, replace the rectifier.

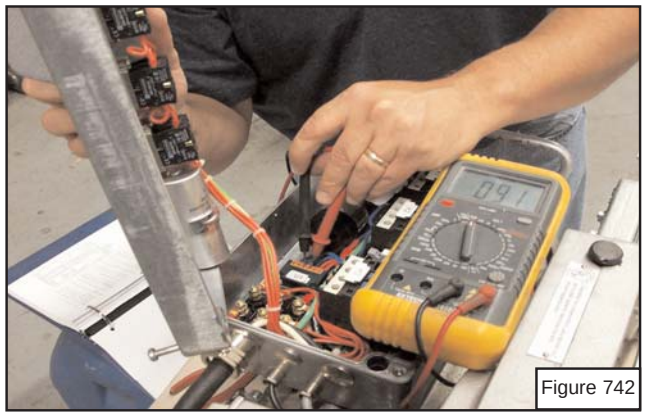


Figure 742

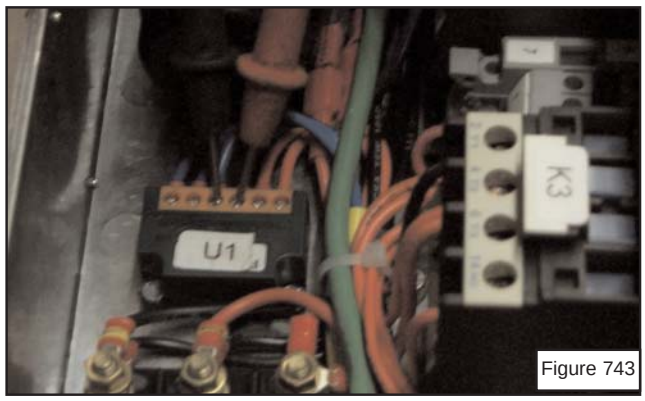


Figure 743

7-16 Direct Control 220V Control Box Parts List XE501PA1 (Page 1 of 2)

Spare Parts	Drawing	22543	CONTROL BOX GC 13/10.3		N°	E-3063
	List	22544			Edition	1
	State	10.07.97	200V / 60 Hz Single Phase	for XE501PA1	Date	4/18/03

Pos.	Code #	Qty.	Designation	Specification
-	27937	1	teminal box complete	-
1	45437	1	terminal box with cover (empty)	-
2	17846	1	terminal box gasket	DK80-112R/02
3	35435	1	EMERGENCY-STOP protection	-
4	22925	1	mounting rail	35X230
4A	60956	3	replacement coil only	220V
5	26226	3	air contactor	LC1-D12.10/230V
7	36766	1	mechanical interlocking	-
8	22426	1	terminal board complete, not assembled	-
10	10917	1	bridge rectifier	B500/440-2SiG-S
12	23446	5	terminal block	-
13	22856	1	end plate	-
15	18566	2	identification label 1-10	-
16	22366	1	fuse block with plate	-
17	21076	2	fine-wire fuse	5x20 2A flink
19	21706	2	push button block	-
20	21716	2	push button cover	-
21	21746	1	EMERGENCY-STOP block	-
22	18296	1	EMERGENCY-STOP cover	-
23	37776	1	EMERGENCY-STOP label	-
24	44466	1	label UP	ø 14,5 mm
25	44476	1	label DOWN	ø 14,5 mm
26	23696	1	plug with cover	3P/20A/250V
27	63905	1	cable	3x4x800
28	15026	1	cable bushing with strain relief	Pg 21
29	25056	2	cable bushing	Pg 7
30	18276	1	screw cap	Pg 16
31	18256	1	screw cap	Pg 11
(33*)	11021	3	insolating tube	4,2x0,6
34	33156	4	socket head cap screw	M5x15 DIN 912
35	16	2	cheese head screw	M4x8 DIN 84
36	33126	5	cheese head screw	M4x10 DIN 84
37	17016	2	cheese head screw	M3x12 DIN 84
38	7536	2	hexagonal screw	M6x12 DIN 933
39	16246	4	spring washer	A5 DIN 127
40	16616	2	spring washer	A6 DIN 127
42	10236	2	cheese head screw	M5x8 DIN 84
43	18906	2	pipe clamp	Pg 29
44	24906	1	starting capacitor	110MF/250V
45	63456	1	run capacitor	35MF/450V
53	93131	4	screws for terminal box cover	M6x35

*) not shown

7-16 Direct Control 220V Control Box Parts List XE501PA1 (Page 2 of 2)

Spare Parts	Drawing	22543	CONTROL BOX GC 13/10.3		N°	E-3063
	List	22544			Edition	1
	State	10.07.97	200V / 60 Hz Single Phase	for XE501PA1	Date	4/18/03

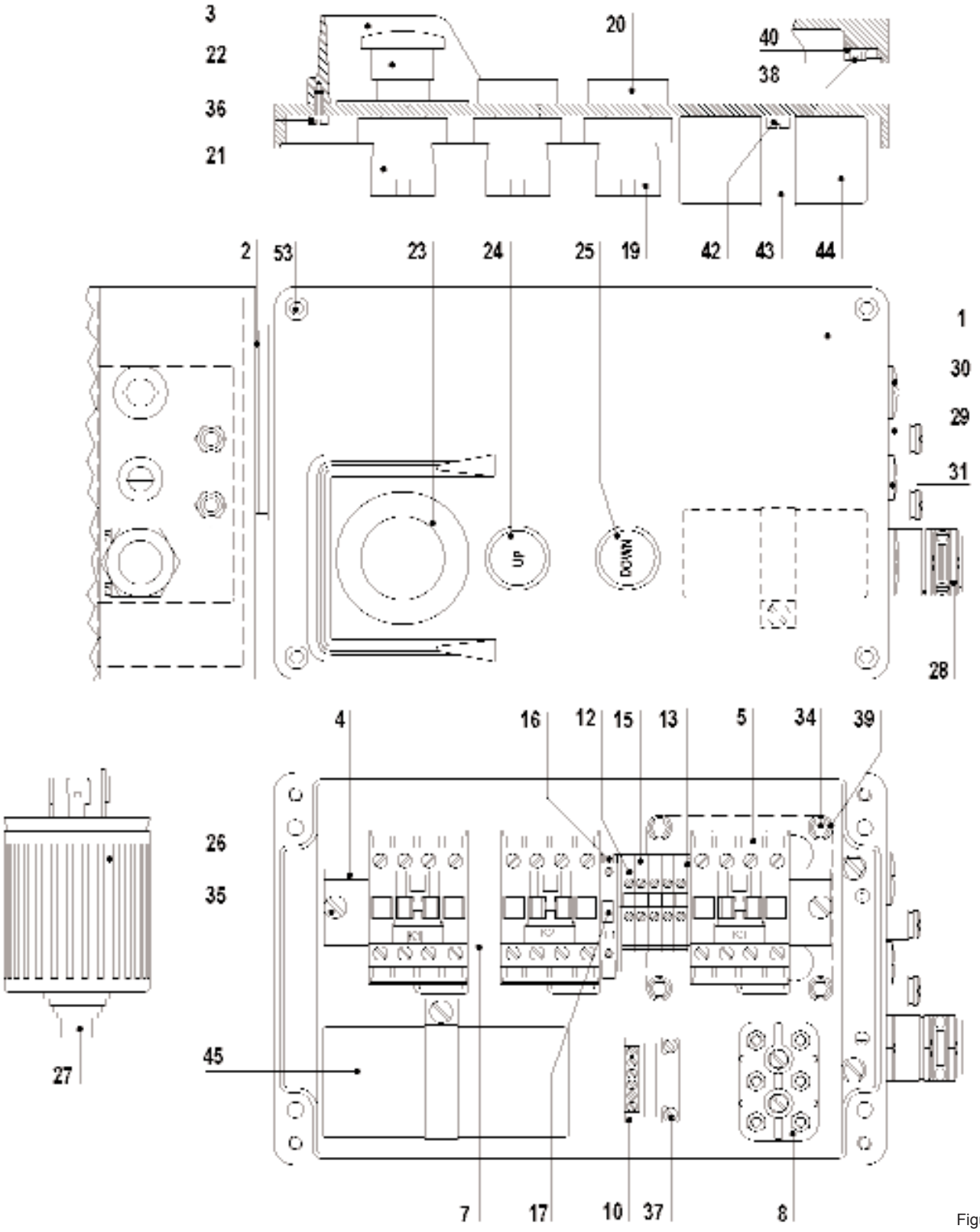


Figure 744

7-17 Pendant Control 220V Control Box Parts List XE501PA1 (Page 1 of 2)

Spare Parts	Drawing	14835	CONTROL BOX GC 13/10.4		N°	E-3062
	List	14834			Edition	2
	State	10.07.97	200V / 60 Hz Single Phase	for XE501PA1	Date	4/18/03

Pos.	Code #	Qty.	Designation	Specification
-	23347	1	terminal box complete	-
1	48557	1	terminal box with cover	-
2	17846	1	terminal box gasket	DK80-112R/02
4	22925	1	mounting rail	35X230
4A	60956	3	replacement coil only	220V
5	26226	3	air contactor	LC1-D12.10/230V
7	36766	1	mechanical interlocking	-
8	22426	1	terminal board complete, not assembled	-
10	10917	1	bridge rectifier	B500/440-2SiG-S
12	24346	5	terminal block	-
13	22856	1	end plate	-
15	18566	2	identification label 1-10	-
16	22366	1	fuse block with plate	-
17	21076	2	fine-wire fuse	5x20 2A flink
19	21706	2	push button block	-
20	21716	2	push button cover	-
21	21746	1	EMERGENCY STOP block	-
22	18296	1	EMERGENCY STOP cover	-
24	44466	1	label UP	ø 14,5 mm
25	44476	1	label DOWN	ø 14,5 mm
26	23696	1	plug with cover	3P/20A/250V
27	63905	1	cable	3x4x800
28	15026	1	cable bushing with strain relief	Pg 21
29	25056	2	cable bushing	Pg 7
31	18256	1	screw cap	Pg 11
(33*)	11021	3	insolating tube	4,2x0,6
34	33156	4	socket head cap screw	M5x15 DIN 912
35	16	2	cheese head screw	M4x8 DIN 84
36	33126	2	cheese head screw	M4x10 DIN 84
37	17016	2	cheese head screw	M3x12 DIN 84
38	7536	2	hexagonal screw	M6x12 DIN 933
39	16246	4	spring washer	A5 DIN 127
40	16616	2	spring washer	A6 DIN 127
42	10236	2	cheese head screw	M5x8 DIN 84
43	18906	2	pipe clamp	Pg 29
44	24906	1	starting capacitor	110MF/250V
45	23686	1	run capacitor	35MF/450V
50	26086	1	pendant control casing(empty)	-
51	67585	1	cable	5x1,5(1,3)x3000
52	24786	1	cable bushing with strain relief	Pg 16
53	93131	4	set of screws for terminal box	M6x35

*) not shown

7-17 Pendant Control 220V Control Box Parts List XE501PA1 (Page 2 of 2)

Spare Parts	Drawing	14835	CONTROL BOX GC 13/10.4		N°	E-3062
	List	14834			Edition	2
	State	10.07.97	200V / 60 Hz Single Phase	for XE501PA1	Date	4/18/03

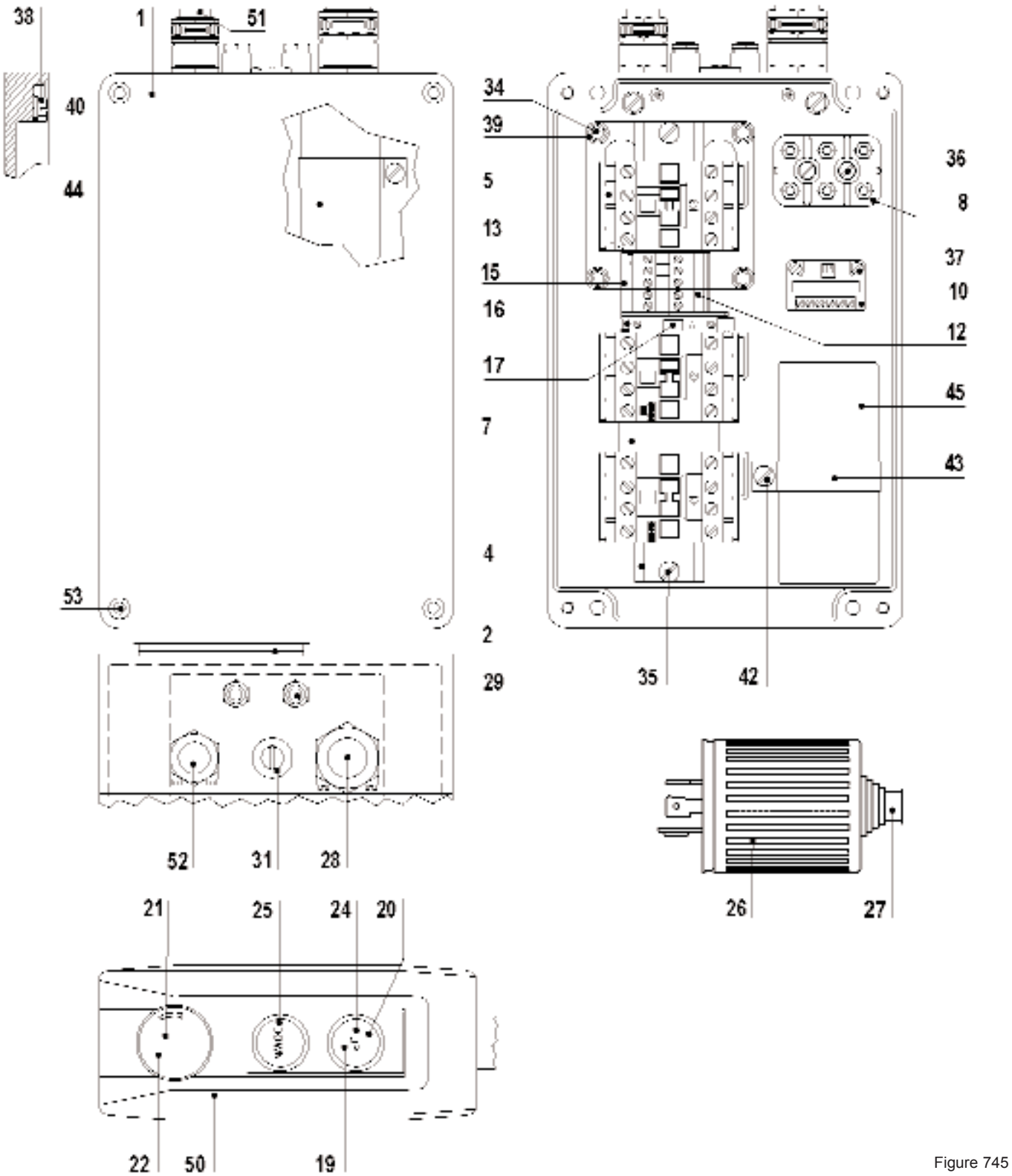
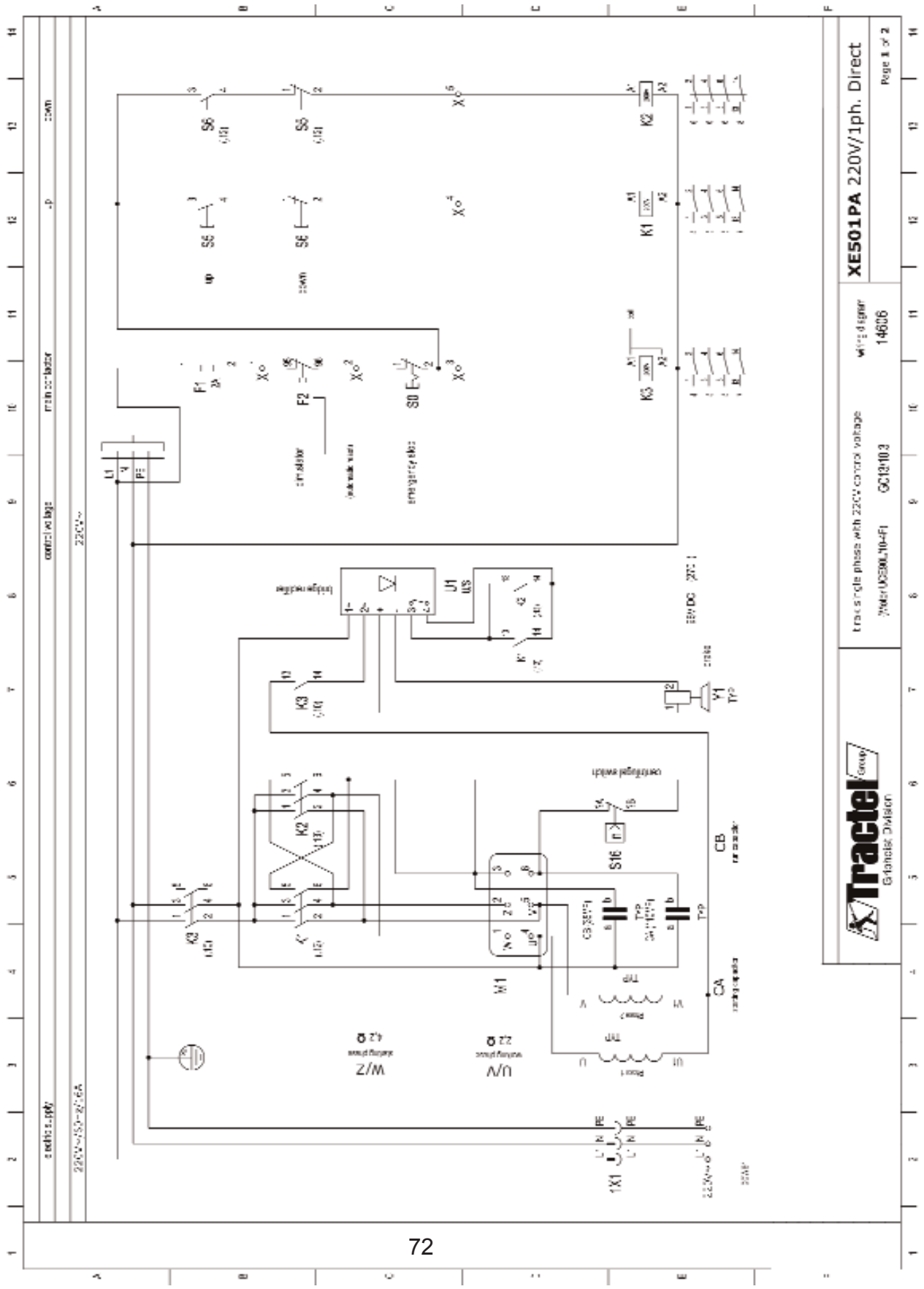


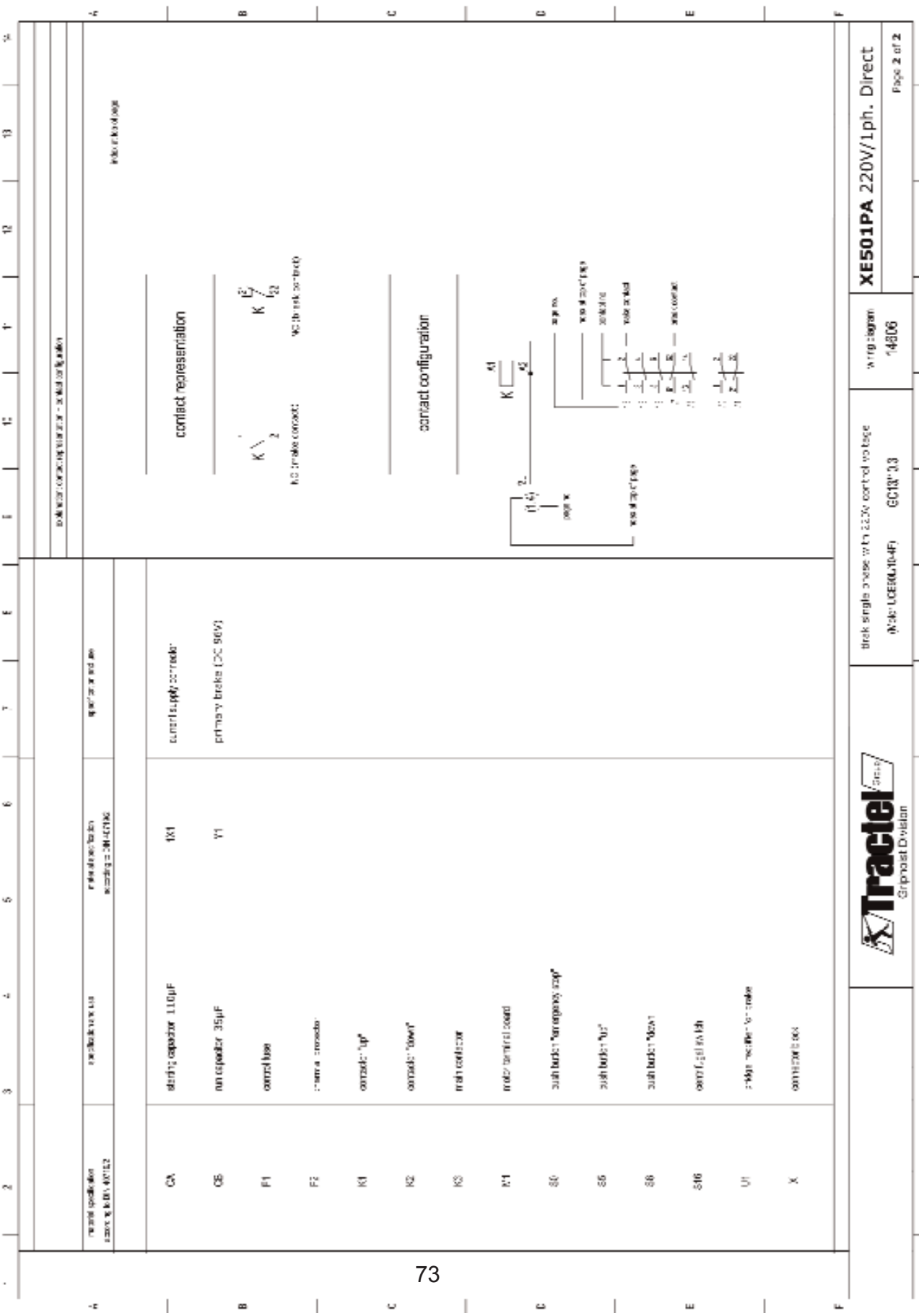
Figure 745

8) WIRING INFORMATION

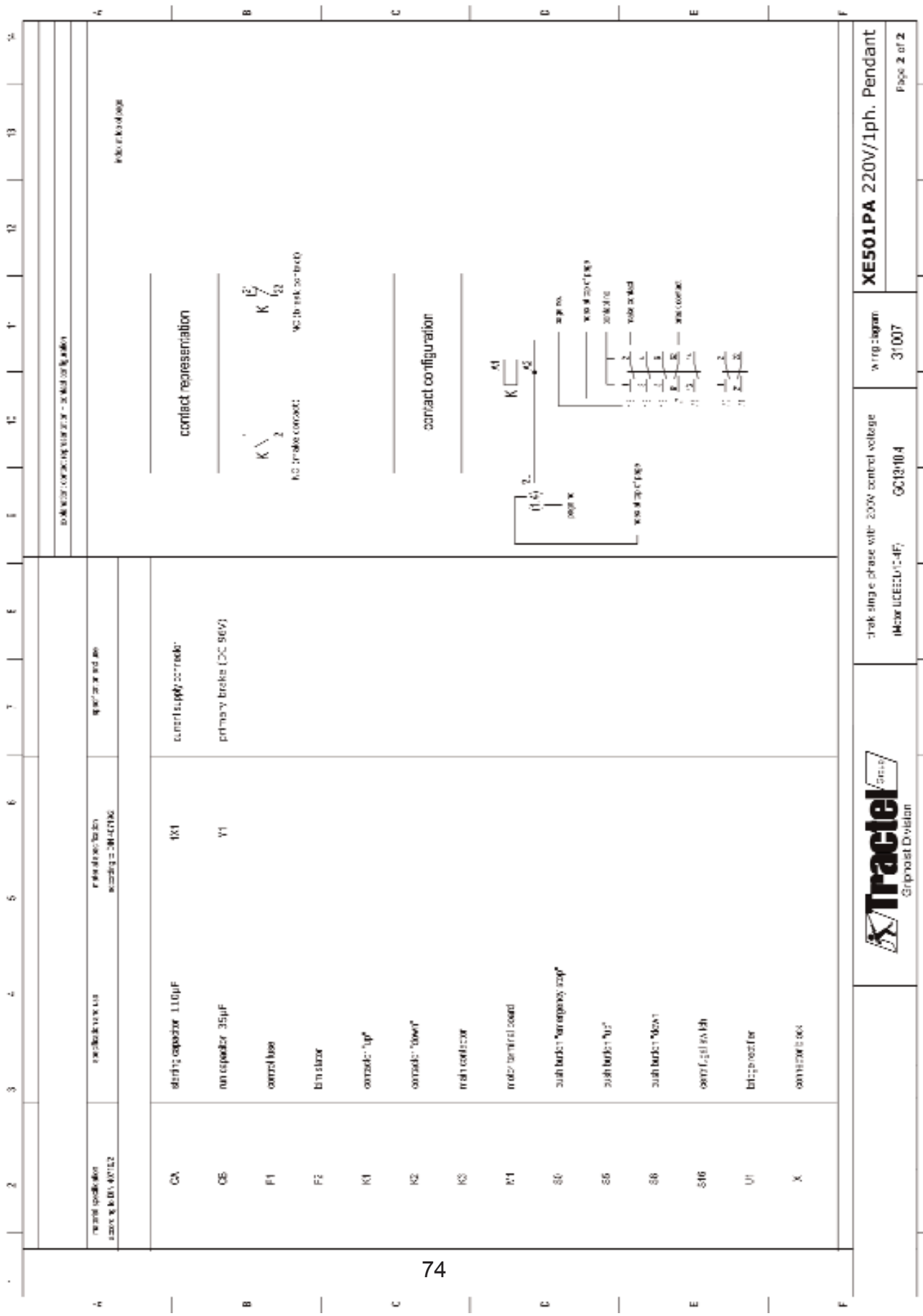
8-1 Wiring Diagram XE501PA1 Direct Control, Plan 14606 (Page 1 of 2)



8-1 Wiring Diagram XE501PA1 Direct Control, Plan 14606 (Page 2 of 2)



8-2 Wiring Diagram XE501PA1 Pendant Control, Plan 31007 (Page 1 of 2)



material specification according to DIN 40719	specification/remarks	material description according to DIN 40719	specification and use
CA	starting capacitor 110µF	1X1	current supply connector
CB	run capacitor 35µF	Y1	primary brake (DC 96V)
F1	control fuse		
F2	trim stator		
K1	contactor "up"		
K2	contactor "down"		
K3	main contactor		
M1	motor terminal board		
S0	push button "emergency stop"		
S5	push button "up"		
S6	push button "down"		
S16	control switch		
U1	bridge rectifier		
X	connection box		

auxiliary contact representation - contact configuration

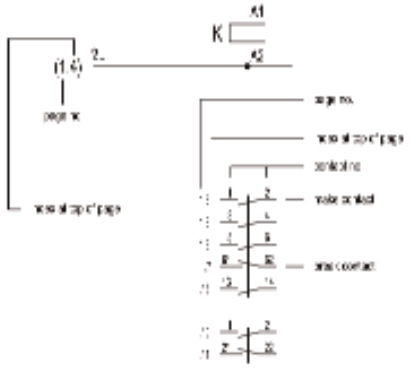
index of contact pages

contact representation

K 2 — NO (make contact)

K 21 / 22 — NC (break contact)

contact configuration



Tractel Group — Griphoist Division	drak single phase with 230V control voltage (Motor UCE2DV104F) GC13104	wiring diagram 31007	**XE501PA** 220V/1ph. Pendant	Page 2 of 2

8-3 Wiring Connection of Stator XE501PA1

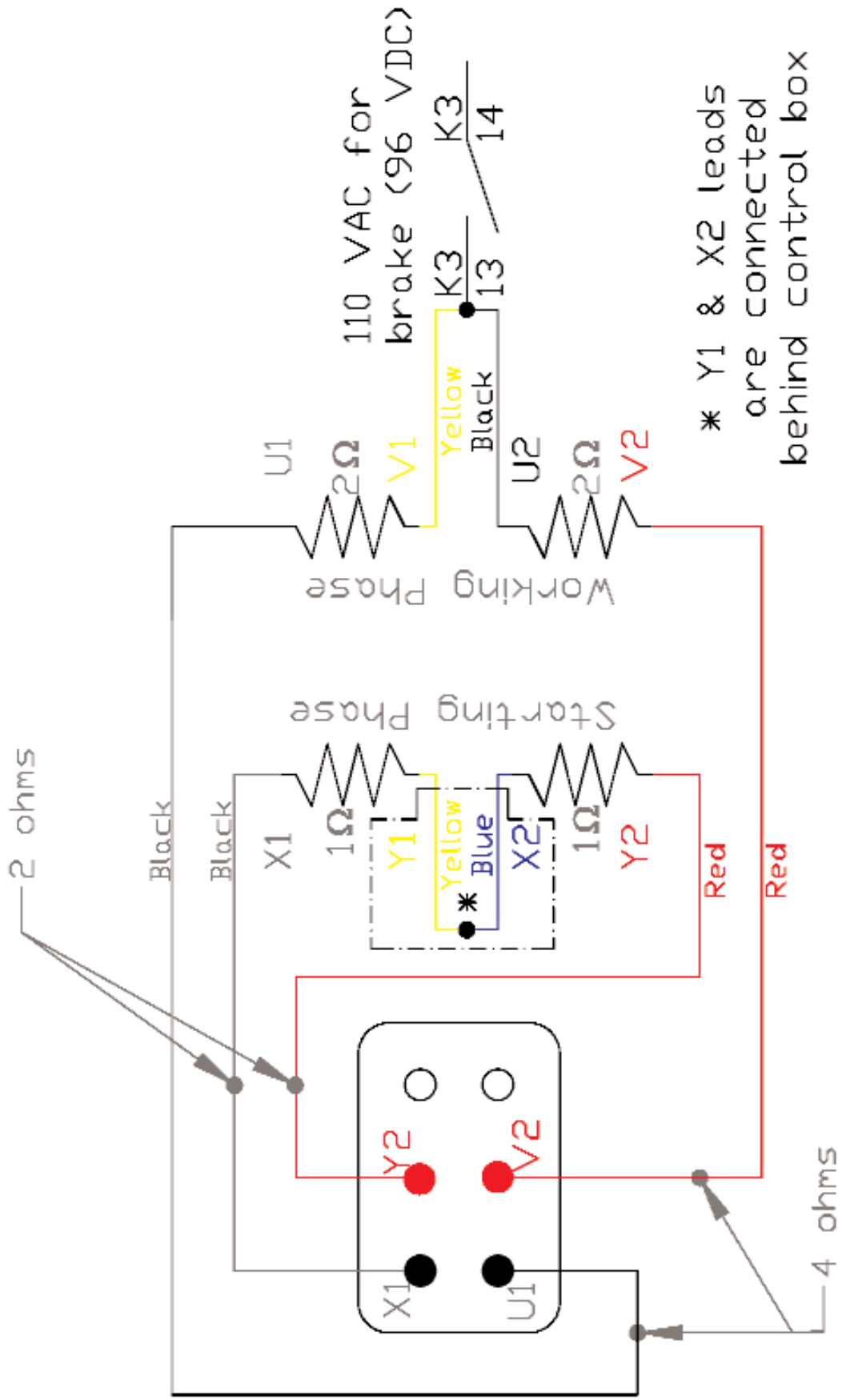


Figure 801

9) WIRE ROPE SPECIFICATION TIRAK

There seems to be some question as to selection of wire rope due to the many people offering wire rope today

Before Tractel chooses a supplier of wire rope we run an endurance test or cycle test to make certain that the rope functions well in the hoist and has good life. The European norms require 1000 cycles minimum, UL testing requires 500 cycles. We require 2000 cycles and test with a high-speed hoist 60 ft./ min. to give a more severe dynamic load to the wire rope during starts and stops. After 2000 cycles we allow a certain number of broken wires (not strands) in a given length of rope. Too many breaks are a test failure. We have no idea how or if other rope suppliers test a rope with our hoist. We generally do not test other peoples ropes because it is time consuming and expensive to conduct. We would be inundated with samples.

5 X 19 vs. 5 X 26 Construction 5 strands of 26 wires have smaller wires making up the strands. This provides greater flexibility but smaller outside wires wear out faster during normal use. Smaller wires are less resistant to abrasion. Therefore we primarily recommend 5 X 19. PI equipment often uses 5 X 26 because winders are part of the system and it coils better.

Quality of Manufacture- If a good control is not made on the tension during manufacture, then a loose strand can occur. This shows when lowering a load. It can cause a jam. Preforming requires that tension be monitored. To get a high quality rope requires that high quality wires be used creating very tight tolerances. A poor zinc plating process can cause slippage. Ropes must be lubricated properly or the friction coefficient is poor between the wire rope and the sheave.There should not be a change in the diameter of the wire rope when worn.

Summary- There is much more to wire rope selection than number of strands and number of wires. Tractel supplies only high quality and rigorously tested wire rope from a very few carefully selected and monitored manufacturers.

9-1 Wire Rope Specifications - XE501PA1 (Page 1 of 2)

	1st Choice	**2nd** Choice	**3rd** Choice
Hoist Types:	Tirak	Tirak	Tirak
Contruction:	5 x 19	4 x 26 5 x 26	6 x 17*
Strands	5	4 or 5	6
Wires per strand	19	26	17*
Core Type	Polyproplyene splitfilm	same	same or IWRC
Type	Warrington Seale	Seale	Seale
Diameter:	8.4 mm +0 -0.3mm{8.1 - 8.4 mm} 5/16" approx {0.319 - 0.326" }	same	same
Minimum Breaking Load:	10,000 lbs. [4590 kg]	same	same
Material of Construction:	Galvanized Steel wire rope XIPS 200/220 n/ sq. mm	same	same
Rope Lay:	Right hand Regular Lay	same	same
Lubrication:	Core Lubricated	same	same
Preformed:	Yes	same	same

* 6 X 17 is classified as a 6 X19 which may have 15 -26 wires per strand

Table 901

9-1 Wire Rope Specifications - XE501PA1 (Page 2 of 2)

NOTE:
As of 2/15/2002, 5/16” diameter should be used unless otherwise noted (as taken from product literature).

4 x 26	6 x 19	6 x 31	5 x 19	5 x 26
Skyclimber CX1250 Compact Alpha1000	Skyclimber CS1250 IWRC/FC Alpha1500 3/8	Hilo	Tirak/Saturn all models 1st choice L-series	Skyclimber CX1250 Compact Alpha1000
Tirak 3rd choice T-series X-series	Spider Z-Mac1000 IWRC SC40 IWRC			
Saturn 3rd choice 35X series 32L series	Power Climber PC400 IWRC/FC Astro IWRC/FC 5/16 or 3/8	Power Climber PC400 IWRC/FC		Power Climber PC400, Astro Compacted
	Skyman 6 x17 IWRC	Lisbon Hoist 180-050 180-030		Tirak/Saturn all models 2nd choice (1st for reelers) L-series
	Saturn 4th choice 35X series 32L series			
	Tirak 4th choice T-series X-series			

Table 902

9-3 Labels and Nameplates

(1) Advice Label (controlled descent brake operation)

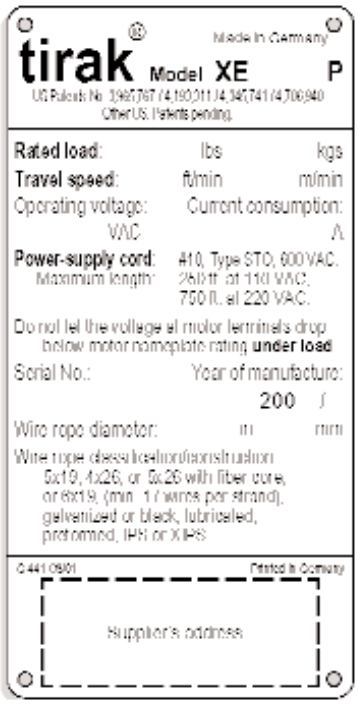
NOTICE: This hoist is equipped with a controlled descent device that will automatically engage in case of primary brake failure. Descent can be stopped with manual operation of the secondary brake.

(2) Emergency Descent Label

(3) Motor nameplate

(4) Primary brake nameplate

(5) TIRAK® nameplate



(6) Warning label (wire rope jam)

If the motor energizes but the wire rope does not move through the hoist:
STOP THE HOIST IMMEDIATELY!
Damaged wire rope may be jammed inside the hoist. Any attempt to move the hoist up or down could cause a dangerous situation and result in bodily injury.

(7) Wire rope diameter label

Wire rope
Ø
5/16"

(8) General Warning & Advice label

WARNING: Only authorized, properly trained, and physically fit personnel shall operate this hoist in strict accordance with the instructions on the hoist and applicable codes! Copy of instructions must be kept with the hoist.

Operating WARNING:
Immediately STOP RUNNING THE HOIST, if wire rope does not move through.

EMERGENCY DESCENT:
Take brake release lever out of TIRAK® handle, and insert in motor cover hole. Push lever upwards.
To STOP release lever.

CAUTION: The TIRAK® can only be used in conjunction with the **BLOCSTOP OVERSPEED** device, which is an integral part of the equipment. Use of this equipment is unsafe and unlawful without proper fall protection equipment used in accordance with OSHA requirements.

SET-UP INSTRUCTIONS: Anchor the hoist, and connect to electric supply. Red button must be out to start the motor.
Start motor, and introduce wire rope, until it reeves itself automatically.
Ensure free rope exit.
Use only specified wire rope in good condition with short tapered end! **Daily check** for broken wires and kinks.

For spare parts or in case of inquiry please mention
Machine Type and Serial No.!

G442 03/01 Printed in Germany

Figure 901

9-4 Checklist

NOTE:
Completion of the checklist MUST always be done before operating the hoist.

TIRAK Hoist Inspection Check List

See Preventive Maintenance Section of instruction manual for details.

Check only components applicable for specific equipment and inspection type.

TIRAK hoist model: _____ Serial-No: _____

	YES	NO
WIRE ROPE HOOKS		
Cracks	☐	○
Excessive wear	☐	○
Bent	☐	○
Spreading	☐	○
Latch damaged/missing	☐	○
BRAKES		
Motor brake worn or not operating	☐	○
Excessive loadbrake drift or backlash	☐	○
Excessive disc wear	☐	○
LIMIT SWITCHES		
Operating properly	○	☐
HOUSING		
Distorted	☐	○
Cracks	☐	○
Loose hardware	☐	○
Bearing noise	☐	○
WIRING		
Loose connections	☐	○
Frayed	☐	○
Damaged	☐	○
Proper grounding	○	☐

	YES	NO
WIRE ROPE		
Broken wires at ends	☐	○
Broken wires excessive	☐	○
Excessive wear	☐	○
Kinked or distorted	☐	○
Corrosion	☐	○
Heat damage	☐	○
OPERATING CONTROLS		
Contactor pitting	☐	○
Operating properly	○	☐
Damaged Control Box	☐	○
LUBRICATION		
Oil leaks	☐	○
LABELS		
Missing	☐	○
Illegible	☐	○
DRUM & SHEAVES		
Worn excessively	☐	○
SUPPORTING STRUCTURE		
Continued ability to support imposed load	○	☐
Worn or distorted parts	☐	○

NOTE: IF ANY (☐) IS CHECKED DO NOT OPERATE THE HOIST UNTIL REPAIRS HAVE BEEN MADE!

Remarks and repairs made: _____

Signature: _____ Date: _____ Clock Number: _____

Figure 902

9-5 Hoist Specification XE501PA1

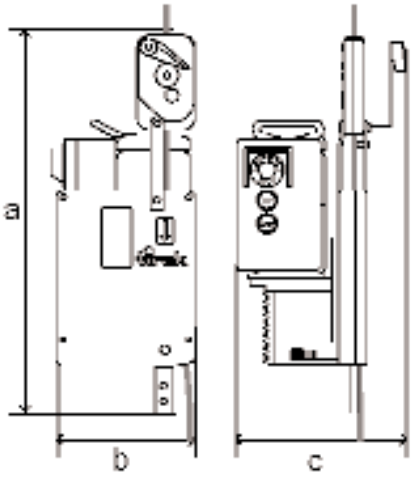


Figure 903

Hoist Model			XE501PA1
with BLOCSTOP model			BSO 500
Rated Load	*lbs*		1000.0
	kg		450.0
Lifting Speed	*ft/min*		35.0
	m/min		11.0
Weight (with BSO)	*lbs*		121.0
	kg		55.0
Dimensions over all	*a*	*in.*	31.8
		mm	743.0
	b	*in.*	12.5
		mm	318.0
	c	*in.*	14.1
		mm	357.0
Motor Specifications			
Single phase 220V / 60 cycles	*kW*		1.1
	A		8.5
Wire Rope Diameter	*in.*		5/16"
	mm		8.4

Misc Info:
- Hoist shall self reeve the wire rope
- Continuous duty motor TEFC
- Controlled descent brake shall be externally attached to the hoist mechanism.
- Emergency lowering without power shall be by means of a mechanical centrifugal brake.

Table 903

Wire rope classification/contruction		5x19 or 5x26 with fiber core lubricated, preformed IPS or XIPS
nominal diameter	*in.*	5/16 in.
	mm	8.4 mm
maximum allowed diameter tolerances for wire rope	*in.*	0.319 to 0.331
	mm	8.1 to 8.4
minumum actual breaking strength	*lbs*	10,000
	kN	44.5

Table 904

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